9-2520-270-34

This copy is a reprint which includes current pages from Changes 1 and 2.

TM 9-2520-270-34

TECHNICAL MANUAL
DIRECT AND GENERAL SUPPORT MAINTENANCE

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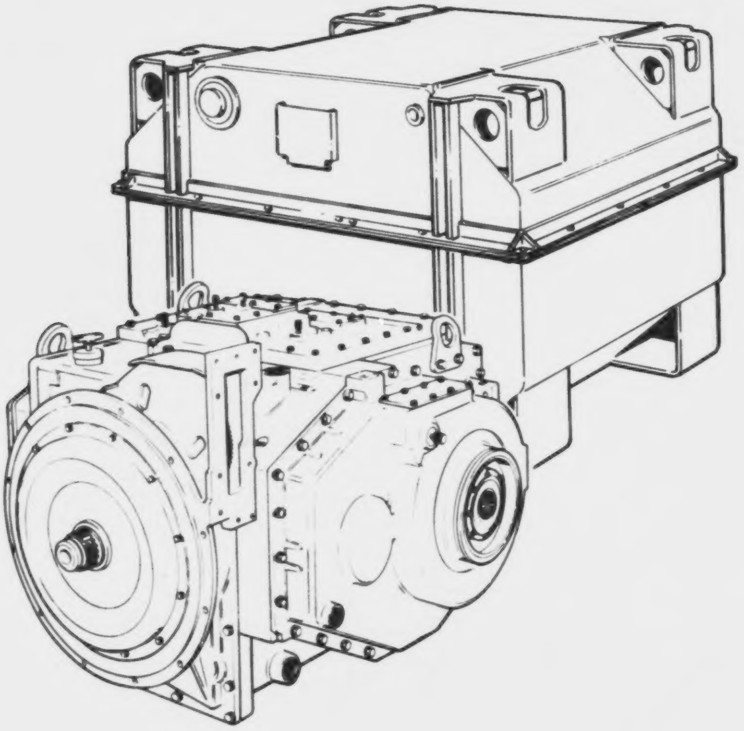

HYDROMECHANICAL CROSSDRIVE TRANSMISSION HMPT 500 AND TRANSMISSION CONTAINER ASSEMBLY

(2520-01-105-6446)

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1984

READEX FICHE best copy available

D101.11:

Reproduced from poor document.

END ITEM APPLICATION

This HYDROMECHANICAL CROSSDRIVE TRANSMISSION, HMPT 500, is used in the following vehicle systems:

Vehicle	TM Number Series
Infantry Fighting Vehicle, M2	9-2350-252
Cavalry Fighting Vehicle, M3	9-2350-252
Multiple Launch Rocket System Carrier, M993	9-1450-646

TM 9-2520-270-34
C2

CHANGE
NO.2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *20 August, 1986*

Intermediate Direct and General Support

Maintenance Manual

HYDROMECHANICAL CROSSDRIVE TRANSMISSION HMPT 500 AND TRANSMISSION CONTAINER ASSEMBLY
(2520-01-105-6446)

TM 9-2520-270-34, 6 November 1984, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
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Remove Pages	*Insert Pages*
i thru viii	i thru viii
xi and xii	xi and xii
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Remove Pages	*Insert Pages*
4-73 thru 4-76	4-73 thru 4-76.1 (4-76.2 blank)
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4-543 and 4-544	4-543 and 4-544
A1 and A2	A1 and A2
B1 and B2	B1 and B2
C1 thru C3 (C4 blank)	C1 thru C3 (C4 blank)
D1 and D2	D1 and D2
--	D5 (D6 blank) (add)
Index 1 thru Index 12	Index 1 thru Index 12

File this change sheet in front of the publication for reference purposes

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

Distribute IAW DA Form 12-37R for Direct and General Support Maintenance requirements for Bradley Infantry/Cavalry Fighting Vehicles, M2/M3 and DA Form 12-32R for Direct and General Support Maintenance requirements for Multiple Launch Rocket System (MLRS).

TM 9-2520-270-34
C1

CHANGE
NO.1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *30 January 1986*

Direct and General Support

Maintenance Manual

HYDROMECHANICAL CROSSDRIVE TRANSMISSION HMPT 500 AND TRANSMISSION CONTAINER ASSEMBLY
(2520-01-105-6446)

TM 9-2520-270-34, November 1984, is changed as follows:

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2. New or changed material is indicatd by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a pointing hand adjacent to the illustration.

Remove Pages	*Insert Pages*
i thru iv	i thru iv
vii and viii	vii and viii
xi thru xiv	xi thru xiv
xvii thru xxiv	xvii thru xxiv
1-1 and 1-2	1-1 thru 1-2.1 (1-2.2 blank)
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File this change sheet in front of the publication for reference purposes.

III. ACTION. (Continued)

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2-137 thru 2-140	2-137 thru 2-139 (2-140 blank)
2-143 and 2-144	2-143 and 2-144
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3-1 thru 3-10	3-1 thru 3-10
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4-439 thru 4-442	4-439 thru 4-442

III. ACTION. (Continued)

Remove Pages	*Insert Pages*
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4-451 thru 4-458	4-451 thru 4-458
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C-1 thru C-3 (C-4 blank)	C-1 thru C-3 (C-4 blank)
— — —	D-1 thru D-4 (add)
Index 1 thru Index 8	Index 1 thru Index [illegible]
Index 11 and Index 12	Index 11 and Index 12

B. TRANSMITTAL PAGES. Insert these change sheet pages (pages 1, 2, and 3 (4 blank) at the front of your copy of TM 9-2520-270-34 (November 1984).

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-32R, Direct and General Support Maintenance requirements for Multiple Launch Rocket System and DA Form 12-37R, Direct and General Support Maintenance requirements for Bradley Infantry/Calvalry Fighting Vehicle (M2/3).

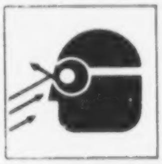
SUMMARY OF WARNINGS AND FIRST AID

This list summarizes critical WARNINGs in this manual. They are repeated here to let you know how important they are. Study these WARNINGs carefully. They can save your life and the lives of soldiers you work with.

WARNING

Cleaning solvent is poisonous and can burn. Continued exposure to solvent can cause skin problems.

- **Always use in area with good air flow away from heat or flames.**
- **Do not breathe solvent fumes.**
- **Do not put hands in solvent.**
- **If solvent gets on hands, wash them.**
- **If solvent gets in eyes, flush with fresh water and get medical help.**
- **Keep fire extinguisher nearby.**



WARNING

- **Compressed air can injure you and others. Do not aim air at soldiers Do not use more pressure than 30 psi (207 kPa). Always wear goggles.**
- **Parts may slip and cause eye injury or blindness. Always wear goggles when using power tools or when you have parts under pressure.**

WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

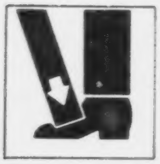
WARNING

Sharp edges can cut hands. Use rags or brush to lubricate.

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

WARNING



Failure to properly secure the transmission can cause injury to personnel or damage to transmission.

WARNING

- Parts could fall and injure you. Use helper or lifting device to move heavy parts.

For artificial respiration and first aid, see FM 21-11.

Technical Manual
No. 9-2520-270-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *6 November 1984*

TECHNICAL MANUAL INTERMEDIATE DIRECT AND GENERAL SUPPORT MAINTENANCE HYDROMECHANICAL CROSSDRIVE TRANSMISSION HMPT 500 AND TRANSMISSION CONTAINER ASSEMBLY

(2520-01-105-6446)

Reporting Errors and Recommending Improvement

You can help improve this manual. If you find any mistakes, or if you know a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, Michigan 48397-5000. A reply will be sent to you.

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CHAPTER	2	GENERAL MAINTENANCE PROCEDURES	2-1
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	II	Service Upon Receipt	2-1
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APPENDIX B EXPENDABLE SUPPLIES AND MATERIALS LIST B-1

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APPENDIX D ILLUSTRATED LIST OF MANUFACTURED ITEMS D-1

GLOSSARY .... Glossary 1
I Abbreviations .... Glossary 1
II Unusual Terms .... Glossary 1

ALPHABETICAL INDEX INDEX-1

HOW TO USE THIS MANUAL

Before starting any inspection or maintenance procedures, read HOW TO USE THIS MANUAL, CHAPTER 1-INTRODUCTION, and CHAPTER 2-GENERAL MAINTENANCE PROCEDURES.

WHAT'S IN THE MANUAL — FRONT TO BACK

END ITEM APPLICATION lists the vehicles that use the Hydromechanical Crossdrive Transmission, HMPT 500.

SUMMARY OF WARNINGS AND FIRST AID lists the warnings and first aid information in this manual. These warnings contain additional information about things that could hurt or kill personnel. The maintenance task may have a shorter version of these warnings.

TABLE OF CONTENTS lists the chapters, sections, appendixes, and alphabetical index in this manual. It also lists the pages where chapters, sections, appendixes, and alphabetical index can be found.

CHAPTER 1 covers general information and gives a quick review of major transmission and container components and features.

CHAPTER 2 contains information on: transmission and container repair parts, special tools, and support equipment; preparing the transmission for servicing, shipping, or storage; and general and special cleaning and inspection procedures. In addition, chapter 2 contains the Fault Symptom Index, inspection trees, and procedures for removal and installation of inserts.

CHAPTER 3 contains maintenance tasks authorized to be performed at the Intermediate Direct Support (IDS) level.

CHAPTER 4 contains maintenance tasks authorized to be performed at the Intermediate General Support (IGS) level.

APPENDIX A lists references such as technical manuals and other publications to be used by personnel.

APPENDIX B lists expendable supplies and materials used to maintain or repair the transmission and the container.

APPENDIX C lists special tools used to maintain or repair the transmission and the container.

APPENDIX D lists and provides manufacturing requirements for items used to maintain or repair the transmission and the container.

GLOSSARY gives the meanings of abbreviations and unusual terms found in the manual.

ALPHABETICAL INDEX lists major transmission and container parts that would be repaired or replaced at the IDS or IGS level. Each entry in the index includes a page number.

DA FORM 2028-2 is used to report an error found in this manual.

METRIC CONVERSION CHART (last page) converts U.S. measurements to their metric equivalents. Measurements in the tasks are given in both U.S. and metric units.

HOW TO USE THIS MANUAL (cont)

COMMON TERMS

Before using this manual, there are many terms that you should first become familiar with. You must understand these terms to use this manual. Definitions of these terms and how they are used follow.

WARNINGS, CAUTIONS, AND NOTES

Pay attention to all warnings and cautions within the task. Ignoring a warning could cause death or injury to personnel. Ignoring a caution could cause damage to equipment. Notes contain facts to make the task easier. Both warnings and cautions always appear just above the task step to which they apply.

A short version of a warning may be used in the maintenance task. If the short version is used, the following words will be included: "Read warning in the front of this manual."

***WARNINGs:* Call attention to things that could kill or injure personnel and are also listed in front of manual.**

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

***CAUTIONs:* Call attention to things or actions that could damage equipment.**

CAUTION

Do not bend springs or actuator valve assemblies. Controller can be damaged.

***NOTEs:* Contain important facts or things to make task easier.**

NOTE

If input bevel gear or pinion is damaged, both gears must be replaced as a matched set.

HELPER

If a helper assists with a step or substep, the step will include: "Repairer and helper. . . ."

Example: 32. REPAIRER AND HELPER INSTALL OUTPUT HOUSING (14).

If a helper performs the action alone, the step or substep will start with "(H)."

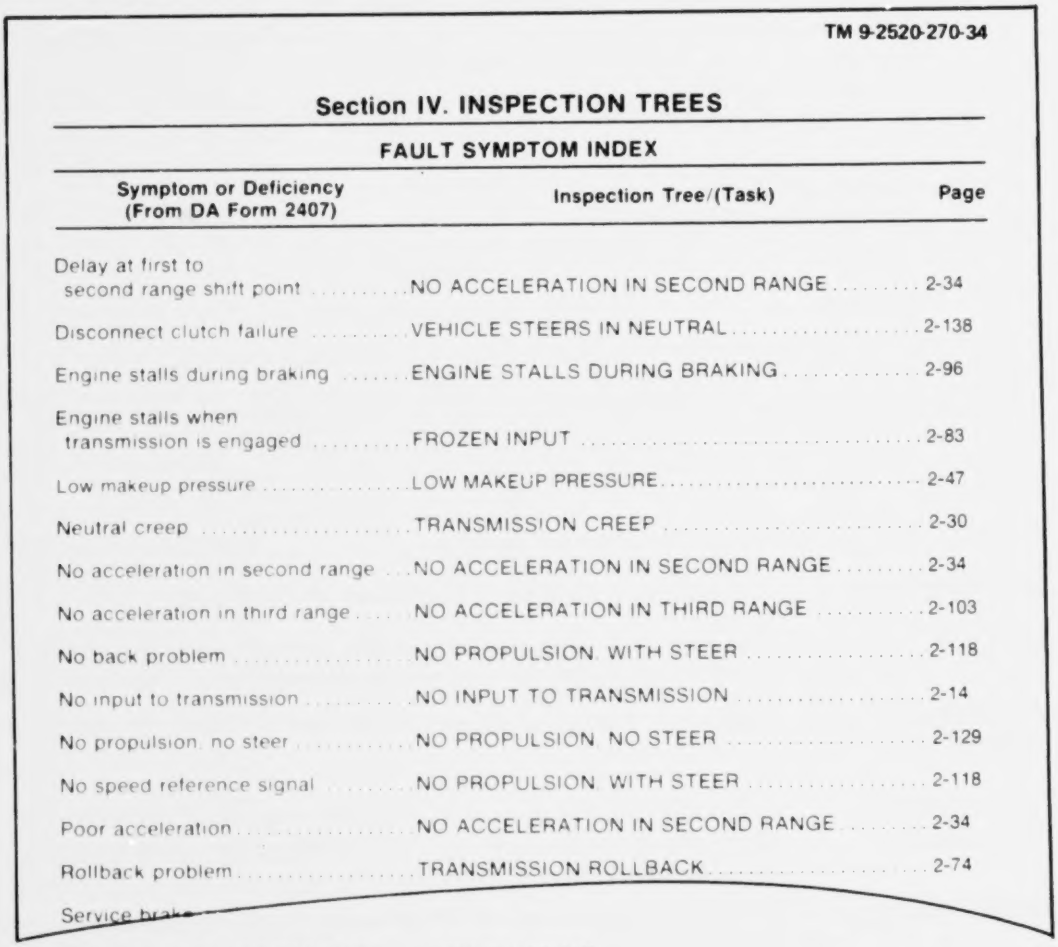
Example: d. (H) Turn installer (7) one complete turn to be sure output housing (5) is properly seated.

DA FORM 2407 (From Unit Maintenance)

A DA FORM 2407 will accompany any faulty transmission. Before you repair a faulty transmission, review the DA FORM 2407 that came with it. One or more fault symptoms will be described on the form. You will use the fault symptoms and the FAULT SYMPTOM INDEX to determine which inspection tree (or task) to use for a given fault.

FAULT SYMPTOM INDEX

The FAULT SYMPTOM INDEX lists each failure or deficiency that might be found on DA FORM 2407. It also lists the inspection tree (or task) you will use for locating and repairing the failure. Look at the example below.



TM 9-2520-270-34

Section IV. INSPECTION TREES

FAULT SYMPTOM INDEX

Symptom or Deficiency (From DA Form 2407)	Inspection Tree/(Task)	Page
Delay at first to second range shift point	NO ACCELERATION IN SECOND RANGE	2-34
Disconnect clutch failure	VEHICLE STEERS IN NEUTRAL	2-138
Engine stalls during braking	ENGINE STALLS DURING BRAKING	2-96
Engine stalls when transmission is engaged	FROZEN INPUT	2-83
Low makeup pressure	LOW MAKEUP PRESSURE	2-47
Neutral creep	TRANSMISSION CREEP	2-30
No acceleration in second range	NO ACCELERATION IN SECOND RANGE	2-34
No acceleration in third range	NO ACCELERATION IN THIRD RANGE	2-103
No back problem	NO PROPULSION. WITH STEER	2-118
No input to transmission	NO INPUT TO TRANSMISSION	2-14
No propulsion, no steer	NO PROPULSION, NO STEER	2-129
No speed reference signal	NO PROPULSION, WITH STEER	2-118
Poor acceleration	NO ACCELERATION IN SECOND RANGE	2-34
Rollback problem	TRANSMISSION ROLLBACK	2-74
Service		

DA FORM 2404 and DA FORM 2407 — COMPLETING

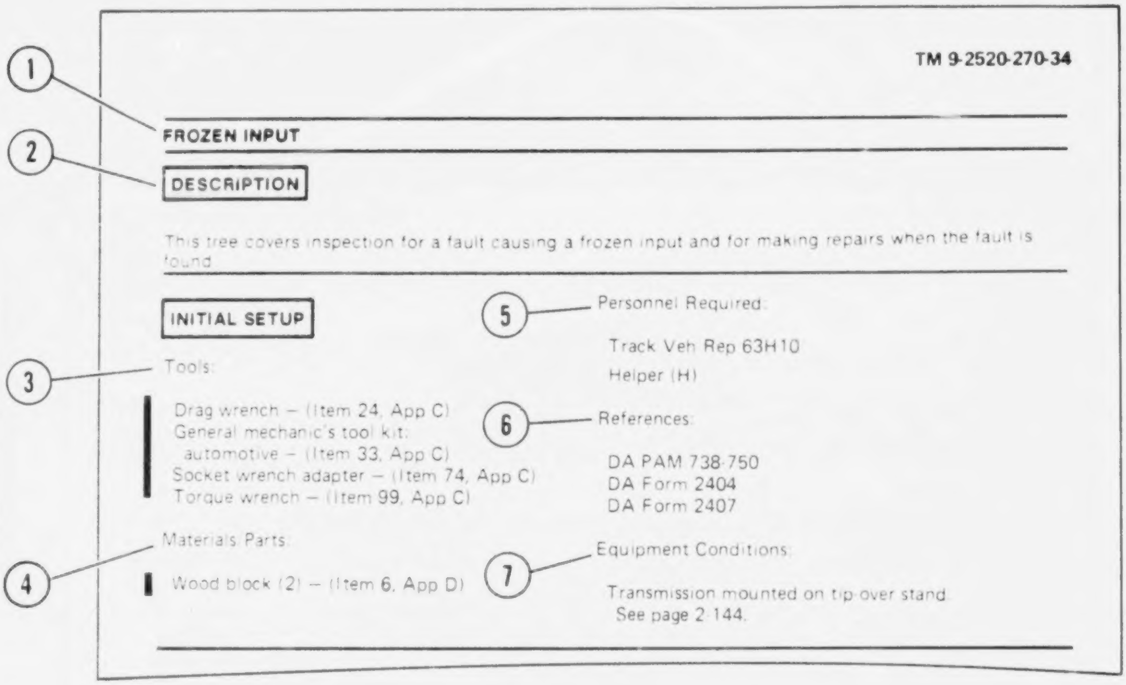
Before going to an inspection tree, you should understand how to properly fill out DA Forms. In this manual, two forms are used. They are DA FORMS 2404 and 2407. If the transmission is repaired, only DA FORM 2404 is completed. If the transmission or components are sent to depot, both DA FORMS 2404 and 2407 are completed and accompany the transmission or component.

All data on pages vi and vii deleted.

HOW TO USE THIS MANUAL (cont)

INSPECTION TREES

Below is an example of an inspection tree that was referenced from the Fault Symptom Index.



TM 9-2520-270-34

FROZEN INPUT

DESCRIPTION

This tree covers inspection for a fault causing a frozen input and for making repairs when the fault is found.

INITIAL SETUP

Tools:

Drag wrench – (Item 24, App C)
General mechanic's tool kit:
automotive – (Item 33, App C)
Socket wrench adapter – (Item 74, App C)
Torque wrench – (Item 99, App C)

Materials/Parts:

Wood block (2) – (Item 6, App D)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

Legend to Example Above

① **TITLE**	This is the name of the tree.
② **DESCRIPTION**	This tells you the type of fault covered by the tree.
③ **TOOLS**	These are the tools and equipment you will need to complete the tree. Tools found in the general mechanic's tool kit are not listed separately.
④ **MATERIALS/ PARTS**	These are the materials and parts you will need to complete the tree.
⑤ **PERSONNEL REQUIRED**	This tells you the person authorized to perform the task. If a helper is needed to lift or guide, this person will be identified as "Helper (H)." Make sure the helper you choose has the skills needed to do the job.
⑥ **REFERENCES**	These are publications or forms that are used along with this manual to complete the tree. The publications may contain useful information to help you do as the tree directs. The forms may be used to record information as various inspections are performed. The tree will direct you when to use these references.
⑦ **EQUIPMENT CONDITIONS**	This describes the condition the equipment must be in before you start the task. Each condition is followed by a page reference. Use this reference to find the task that set up that equipment condition.

Reading Inspection Trees

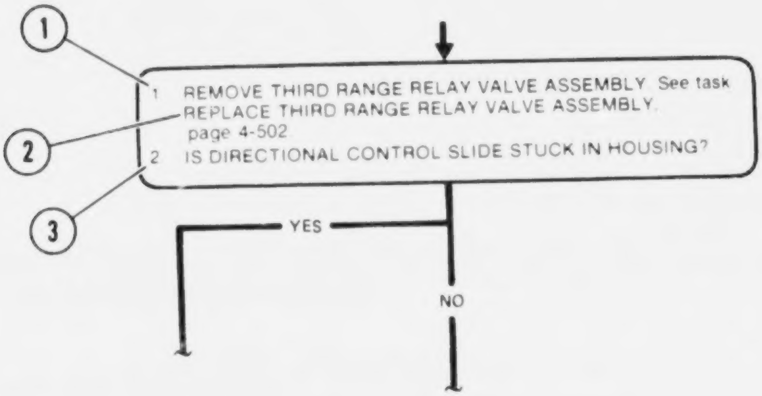
Use the inspection tree as a road map. Read through the tree one block at a time, performing all steps and answering all questions. This will lead you to a failed component or assembly that could be the problem. Be sure to complete every block in the branch of the tree you are following. Do not stop if you find a failed component. Many faults can cause damage to several components. The inspection tree will direct you to check for secondary damage that could be caused by a fault.

TYPES OF BLOCKS

There are several types of inspection tree blocks. The following examples will discuss the types of blocks.

Procedural Block

A procedural block will tell you to perform an element of a task, a complete task, or several tasks. At the end of this block, you will be asked a question based upon the task(s) you have performed. Perform each step in order.


①
1 REMOVE THIRD RANGE RELAY VALVE ASSEMBLY. See task
REPLACE THIRD RANGE RELAY VALVE ASSEMBLY,
page 4-502
②
2 IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?
③
YES
NO

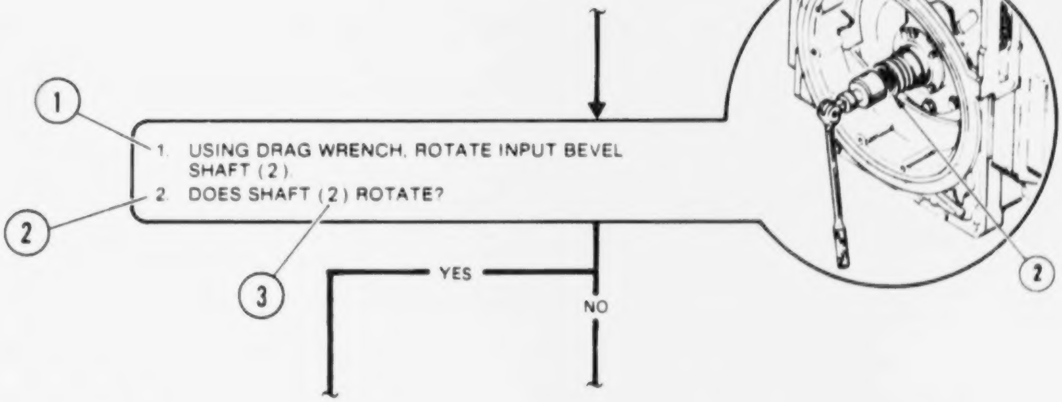
Legend to Example Above

① **TASK ELEMENT**	This is a portion of a task to be performed. When you perform this step, do only the task steps in the **REMOVE** element.
② **REFERENCE TASK**	This is the title of the task you will perform. It will be followed by a page number where that task begins.
③ **QUESTION**	This is a question that requires a decision to be made based upon your inspections as you perform the task element. The branch you will follow depends upon your answer to the question.

HOW TO USE THIS MANUAL (cont)

Instruction Block

An instruction block contains step-by-step instructions for performing a procedure. Instruction blocks do not require any task or task element. Illustrations are used to explain the instructions.



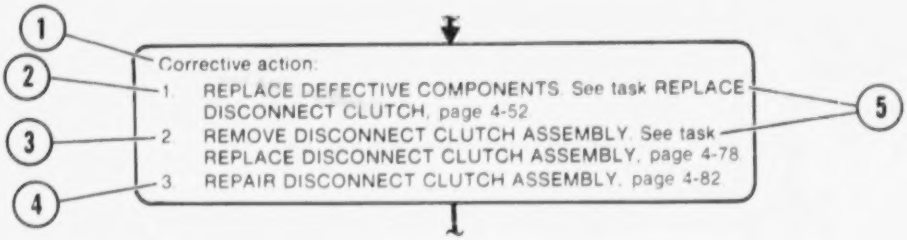
1. USING DRAG WRENCH, ROTATE INPUT BEVEL SHAFT (2).
2. DOES SHAFT (2) ROTATE?

Legend to Example Above

① **INSTRUCTIONAL STEP**	This is a specific action to be performed.
② **QUESTION**	This is a question that requires a decision to be made based upon the step you have just completed. The branch you will follow depends upon your answer to the question.
③ **CALLOUT**	This is a number that identifies a specific part. The circled number in the illustration matches the number in the instuctions.

Corrective Action Block

A corrective action block lists actions to be performed to replace or repair a faulty item. Do NOT perform the actions until directed to do so at the end of the inspection tree. Record these actions on DA FORM 2404.



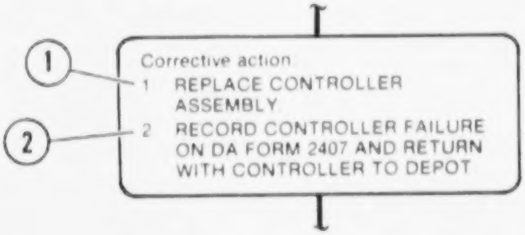
Corrective action:

1. REPLACE DEFECTIVE COMPONENTS. See task REPLACE DISCONNECT CLUTCH, page 4-52
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78
3. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82

Legend to Example Above

① **IDENTIFIER**	This identifies the block as a corrective action block. The actions listed in this block must be recorded on DA FORM 2404.
② **REPLACE INSTRUCTION**	This tells you to refer to a specific task to replace damaged components. It is used when the component to be replaced is not covered in a repair task.
③ **TASK ELEMENT**	This is a portion of a task to be performed. When you perform this task, you will do only the task steps in the **REMOVE** element of the task.
④ **TASK**	This tells you to perform an entire task. It does not reference a specific task element. You will do all elements in the task mentioned in this step.
⑤ **REFERENCE**	This is used to tell you what task you will use when you are directed to perform a task element.

There is one other type of corrective action block that you will see. Below is an example of the other type of corrective action block.



Corrective action:

1. REPLACE CONTROLLER ASSEMBLY
2. RECORD CONTROLLER FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER TO DEPOT

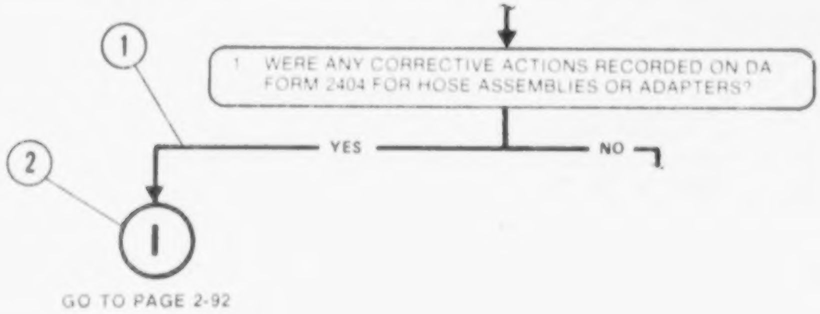
Legend to Example Above

① **GENERAL REPLACE INSTRUCTION**	This tells you to obtain a new component (or assembly) from supply. There is no task reference. Do NOT install this new component. You will be directed to install the component at some other point in the tree.
② **COMPONENT DISPOSITION**	This tells you what to do with a component that must be repaired at depot. You will fill out DA FORM 2407 giving any information that might aid in the repair of the component.

HOW TO USE THIS MANUAL (cont)

TYPES OF SYMBOLS

Two types of symbols are used in the inspection trees. Below is a sample with both symbols.

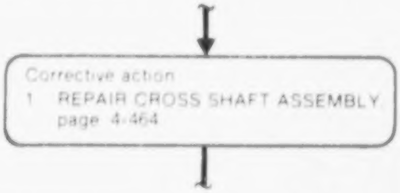

1
2
1 WERE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404 FOR HOSE ASSEMBLIES OR ADAPTERS?
YES
NO
I
GO TO PAGE 2-92

Legend to Example Above

① **FLOW LINES**	Flow lines show the branch you will follow in the inspection tree. When a question is asked, the branches will be labeled "YES" or "NO". You will answer the question and follow that branch.
② **BRANCH LABEL**	Branch labels identify branches which go to another page. When you go to the new page, check to be sure it has the same label. Begin the new page at the branch label and continue with the inspection tree.

TASK REFERENCES

Many blocks in an inspection tree tell you to perform a task or a task element. In every case, the step will tell you the task title and the page where it begins. Below is a sample inspection tree block with a task reference.



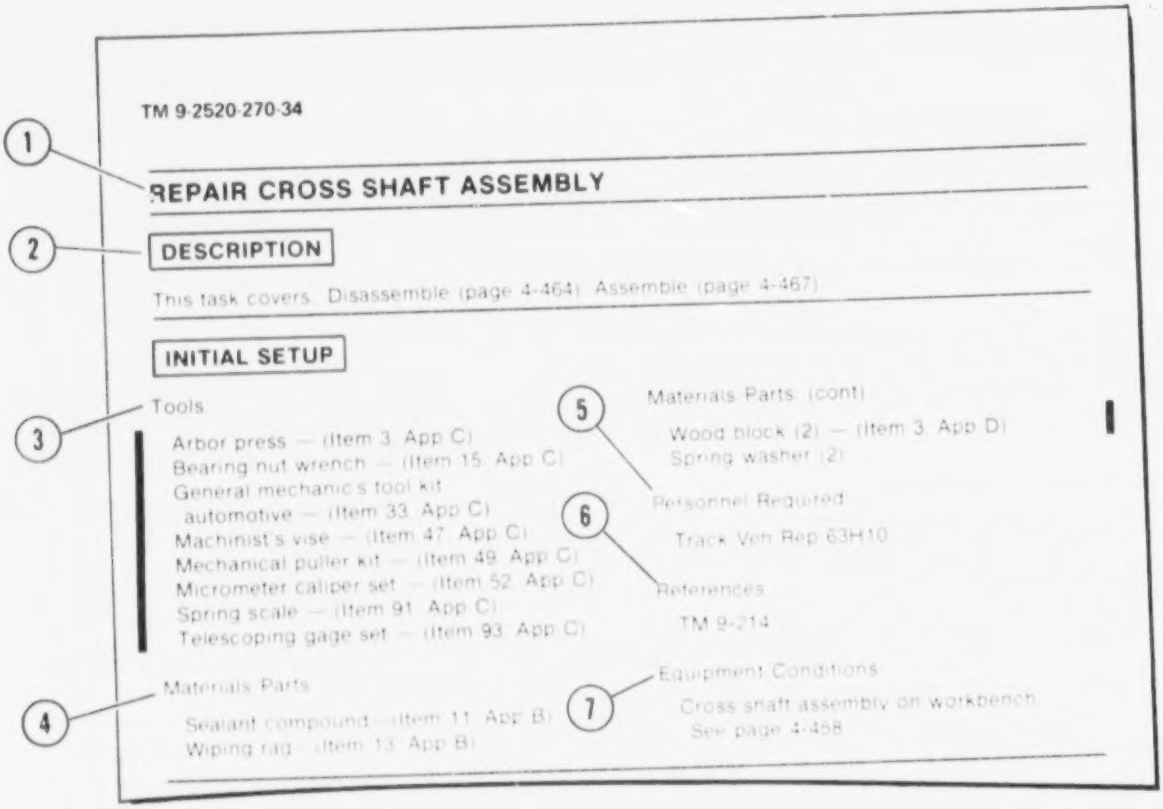
When you come to a corrective action block, you will record the necessary information on DA FORM 2404. Later, the inspection tree will tell you to perform all corrective actions. At that time you will perform the task REPAIR CROSS SHAFT ASSEMBLY on page 4-464.

If a step directs you to perform a task or task element, go to that task. Do all of the task or task element that is required. Then return to the first task and continue with the next step. Do NOT skip any steps unless they have already been done or you are directed to go to END OF TASK. If you are at END OF TASK, return to the first task and continue with the next step.

If you must perform a task element, such as INSTALL DISCONNECT CLUTCH, go to the task REPLACE DISCONNECT CLUTCH on page 4-52. Find the block **INSTALL**. Begin with the first step after the **INSTALL** block and perform all steps in that task element.

MAINTENANCE TASKS

Below is a task that could have been referenced from an inspection tree or directly from a systems manual.



TM 9-2520-270-34

REPAIR CROSS SHAFT ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-464), Assemble (page 4-467)

INITIAL SETUP

Tools

Arbor press — (Item 3, App C)
Bearing nut wrench — (Item 15, App C)
General mechanic's tool kit
automotive — (Item 33, App C)
Machinist's vise — (Item 47, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper set — (Item 52, App C)
Spring scale — (Item 91, App C)
Telescoping gage set — (Item 93, App C)

Materials/Parts

Sealant compound — (Item 11, App B)
Wiping rag — (Item 13, App B)

Materials/Parts (cont)

Wood block (2) — (Item 3, App D)
Spring washer (2)

Personnel Required

Track Veh Rep 63H10

References

TM 9-214

Equipment Conditions

Cross shaft assembly on workbench.
See page 4-458

Legend to Example Above

① **TITLE**	This is the name of the task.
② **DESCRIPTION**	This describes the overall actions you will perform (remove, disassemble, adjust, assemble, install, etc.). It also gives the page where each action begins. The **DESCRIPTION** is left out when it would repeat the action in the task title.
③ **TOOLS**	These are the tools and equipment you will need to complete the task. Part number and national stock number of each tool can be found in Appendix C. Tools found in the general mechanic's tool kit are not listed separately.
④ **MATERIALS/ PARTS**	These are the supplies and parts you will need to do the task. The only parts listed are those you must replace every time the task is performed, such as the spring washers. Use the Repair Parts and Special Tools List (RPSTL) to order the parts you need for the task.

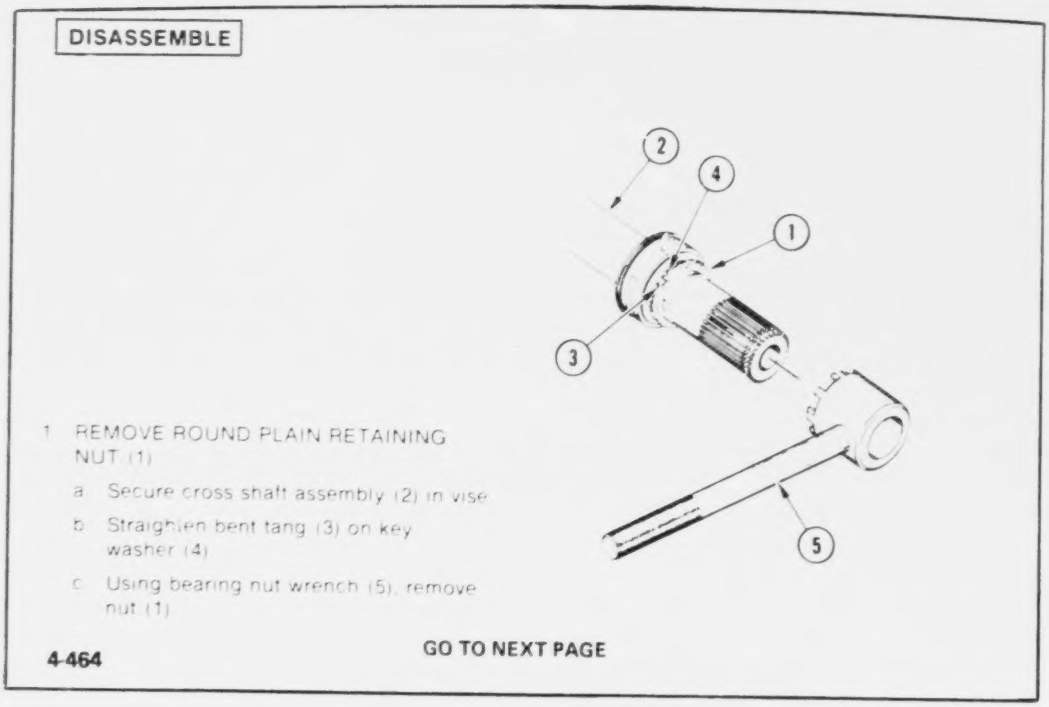
HOW TO USE THIS MANUAL (cont)

⑤ **PERSONNEL REQUIRED**	This tells you the person authorized to perform the task. If a helper is needed to lift or guide, this person will be identified as "Helper (H)". If two helpers are needed, they will be identified as "Helper (H) (2)". Make sure the helpers you choose have the skills needed to do the job.
⑥ **REFERENCES**	These are the other manuals you will need to use, if they are required, to complete the task.
⑦ **EQUIPMENT CONDITIONS**	This describes the condition the equipment must be in before you start the task. Each condition is followed by a page reference. Use this reference to find the task that set up that equipment condition.

Task Steps and Elements

Read through the task for step-by-step, illustrated instructions. The numbered steps in capital letters tell WHAT to do; the lettered steps tell HOW to do it. If you are an experienced mechanic, you may need to read only the numbered steps. If you are a beginning mechanic, you will want to read all the steps. If you come to a step that has already been done, skip that step and go to the next step.

Below is the bottom half of the first page of the task REPAIR CROSS SHAFT ASSEMBLY. Read step 1 of the task. As you read the steps, match each numbered part in the instructions with the same number in the illustration. It is important to read each step in the order given. Note the boxed word **DISASSEMBLE** in the top left corner. It labels one of the major actions for this task and is called a task element. In this and other tasks you could also see boxed words (task elements) like **ASSEMBLE**, **INSPECT**, **REMOVE**, and **INSTALL**.



DISASSEMBLE

1 REMOVE ROUND PLAIN RETAINING NUT (1)

a Secure cross shaft assembly (2) in vise

b Straighten bent tang (3) on key washer (4)

c Using bearing nut wrench (5), remove nut (1)

4-464

GO TO NEXT PAGE

REPLACE

This term is used three ways. Examples of each are shown below:

1. Remove power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
3. REPLACE POWER TAKEOFF ASSEMBLY.

In example 1, the element **REMOVE** is the action to be performed. The **REMOVE** element starts on page 4-140. Perform all steps on the **REMOVE** element.

In example 2, the REPLACE POWER TAKEOFF ASSEMBLY task is the action to be performed. The entire task must be performed starting on page 4-140.

In example 3, there is no referenced action to be performed. REPLACE POWER TAKEOFF ASSEMBLY means get a new assembly from supply but do not install it. Directions for installation will be given in a later step.

REPLACE TASKS

There are two uses for Replace tasks within this manual. A Replace task can be performed to gain access to another part or to replace a defective component.

Replace Task Used for Component Replacement

The following comments apply to a Replace task that is used to replace defective components:

1. Replacement components are new and usually will not be cleaned and inspected. Preservatives must be removed from long-term stored components.
2. Replacement components will be installed.
3. Defective components will be discarded or sent to a higher maintenance level. Components sent to depot maintenance must have a completed DA FORM 2407.
4. The new part will be identified as "new" in the install section. It will also be listed under "Materials/Parts" at the beginning of the task.

Replace Task Used for Access

Most REPLACE tasks can also be used for access to another part. In this case, the original part is removed and then installed later. REPLACE tasks that can also be used for access will be identified by a box around the title in the TASK INDEX. (You will find a TASK INDEX at the beginning of each task section.) The following comments apply to a Replace task used as an access task:

1. Removed components will be cleaned, inspected, and reinstalled if no defects are found or repairs have been accomplished.

HOW TO USE THIS MANUAL (cont)

2. General cleaning, inspection, and repair will be done according to general procedures in chapter 2.

3. A new component will be installed if inspection indicates a component cannot be repaired.

4. The item that can be removed for access or repair will not be listed under "Materials/Parts". Also, this part will not be identified as "new" in the install section of the task.

REPAIR TASK

This term is used to identify a task where defective components are disassembled, repaired, and reassembled. Most REPAIR tasks are performed with the component on the workbench. A few can be performed with the transmission mounted on the tip-over stand. General repair procedures are detailed in chapter 2.

INSPECT TASK

This term is used to identify a task that contains detailed inspection procedures for a component.

CLEAN TASK

This term is used to identify a task that disassembles, cleans, and reassembles the transmission. No repairs are done in a CLEAN task.

REFERENCES

References within a task refer to a different manual or to another task or chapter in the same manual. Steps in tasks differ in the way they reference other tasks or TMs. Examples of references are:

1. Step instruction and referenced task name are the same, such as: REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

2. Step instruction and referenced task name are different, such as: REMOVE ENCASED SEAL. See task REPLACE ENCASED SEAL, page 3-2.

3. Step instruction references a task in another manual, such as: CHECK TRANSMISSION OIL LEVEL. See TM 9-2350-252-10-1 or TM 9-1450-646-10.

4. Step instruction references another chapter in the same manual, such as: INSPECT GEAR (1) FOR DAMAGE. See page 2-5.

CLEANING AND INSPECTION

General clean and inspect procedures for every task are found in CHAPTER 2, GENERAL MAINTENANCE PROCEDURES. Use these procedures to clean and inspect any part being removed, repaired, or installed. Special cleaning and inspection, if required, will be covered in the task.

CHECK

This term is used when an instruction step requires the use of a tool to determine a specific value.

GO TO END OF TASK

This term is used in a task step that contains a conditional situation that might require performance of more steps. If no more steps are to be performed, the task or task element is complete and you are directed to go to END OF TASK. Anytime you arrive at END OF TASK, you must return to the task or troubleshooting tree that sent you to the task.

ALL TASKS

The following comments apply:

1. Items that are always consumed will be referred to as "new", when installed, and will be listed under Materials/Parts on the first page of the task. Examples of items usually consumed are:

   Gaskets
   Lock washers
   Lockwire
   Preformed packings
   Self locking nuts
   Some retaining rings

2. Items that are to be replaced or discarded as the result of a condition (such as check and inspect) will not be listed under Materials/Parts. They will be referred to as "new" when installed.

REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

The RPSTL gives the National Stock Number (NSN) required to order parts used in the maintenance tasks. The RPSTL also gives the Source, Maintenance, and Recoverability (SMR) code that indicates the manner of acquiring support items for maintenance, repair, or overhaul of end items. To use the RPSTL to identify and order a part, do the following:

1. In this manual, turn to the first page of the task to be performed.

2. Find "Materials/Parts" under INITIAL SETUP, and read the part(s) that are listed. If any part is listed, it will be illustrated in the task steps and must be replaced when the task is performed. Next, determine if any other parts are damaged and need to be replaced in the task.

3. Go to the RPSTL and find the same illustrated part. That part will have an item number assigned to it. Look up the item number in the listing for that figure. Look up the SMR code for the item that must be replaced. The SMR code specifies the level of maintenance authorized to perform repair of that item.

4. If the SMR code authorizes you to repair the item, look for the item NSN in the National Stock Number column. Use the item NSN to order a new replacement part.

HOW TO USE THIS MANUAL (cont)

USING YOUR MANUAL ON THE JOB

Like any tool, the best way to learn about this manual is to practice using it. Knowing how to use this manual will save both time and energy.

WHERE DO YOU START?

Entry to a maintenance task in this manual can come from the alphabetical index, Fault Symptom Index, or from inspection trees. The alphabetical index is used when tasks in this manual are referenced from other manuals. The Fault Symptom Index and inspection trees are used when a fault has been determined at Unit Maintenance.

USING THE ALPHABETICAL INDEX TO REFERENCE A TASK

Using another manual could result in reference to a task in this manual. For example, you were asked to find the task "Repair Cross Shaft Assembly" and were referenced to this manual. To find where this task is located, refer to the alphabetical index at the back of this manual.

The index lists each task under one or more headings. The task REPAIR CROSS SHAFT ASSEMBLY could be found:

Under "C"
  Cross Shaft Assembly
    Repair, 4-464

Under "R"
Repair
  Cross Shaft Assembly, 4-464

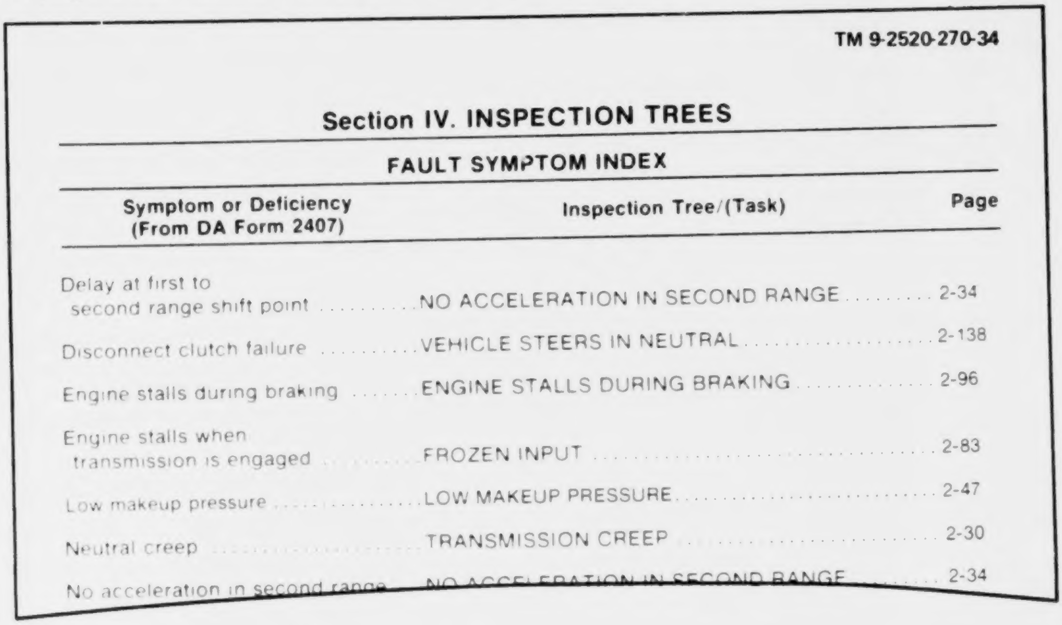
Under "S"
  Shaft Assembly,
    Cross, Repair, 4-464

Turn to task REPAIR CROSS SHAFT ASSEMBLY on page 4-464 of this manual.

USING THE FAULT SYMPTOM INDEX TO REFERENCE AN INSPECTION TREE

The other way to enter the manual is by receiving a DA FORM 2407 with a failed transmission from Unit Maintenance. The form would describe one or more fault symptoms. You must use the fault symptom to determine which inspection tree to follow. For example, the fault symptom listed on the DA FORM 2407 that came with a failed transmission was "neutral creep."

Turn to the FAULT SYMPTOM INDEX in chapter 2. Look up the fault symptom, neutral creep. The FAULT SYMPTOM INDEX sends you to the inspection tree titled TRANSMISSION CREEP, which starts on page 2-30. Turn to that page. Below is an example of the FAULT SYMPTOM INDEX.



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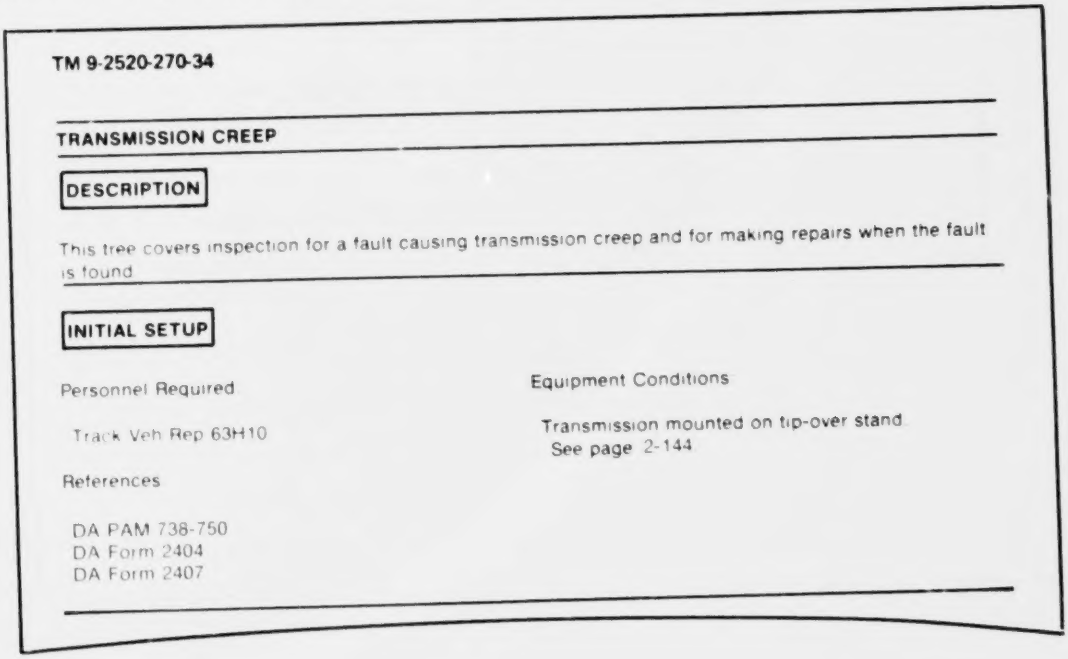
Section IV. INSPECTION TREES

FAULT SYMPTOM INDEX

Symptom or Deficiency (From DA Form 2407)	Inspection Tree/(Task)	Page
Delay at first to second range shift point	NO ACCELERATION IN SECOND RANGE	2-34
Disconnect clutch failure	VEHICLE STEERS IN NEUTRAL	2-138
Engine stalls during braking	ENGINE STALLS DURING BRAKING	2-96
Engine stalls when transmission is engaged	FROZEN INPUT	2-83
Low makeup pressure	LOW MAKEUP PRESSURE	2-47
Neutral creep	TRANSMISSION CREEP	2-30
No acceleration in second range	NO ACCELERATION IN SECOND RANGE	2-34

USING THE INSPECTION TREE

Here is the top of page 2-30. It is the inspection tree TRANSMISSION CREEP, to which the FAULT SYMPTOM INDEX sent you. Read the INITIAL SETUP. Get all tools, parts, and other personnel needed, if any, to do the inspection tree. Tools and parts required to perform referenced tasks are not listed in the inspection trees.



TM 9-2520-270-34

TRANSMISSION CREEP

DESCRIPTION

This tree covers inspection for a fault causing transmission creep and for making repairs when the fault is found

INITIAL SETUP

Personnel Required

Track Veh Rep 63H10

References

DA PAM 738-750
DA Form 2404
DA Form 2407

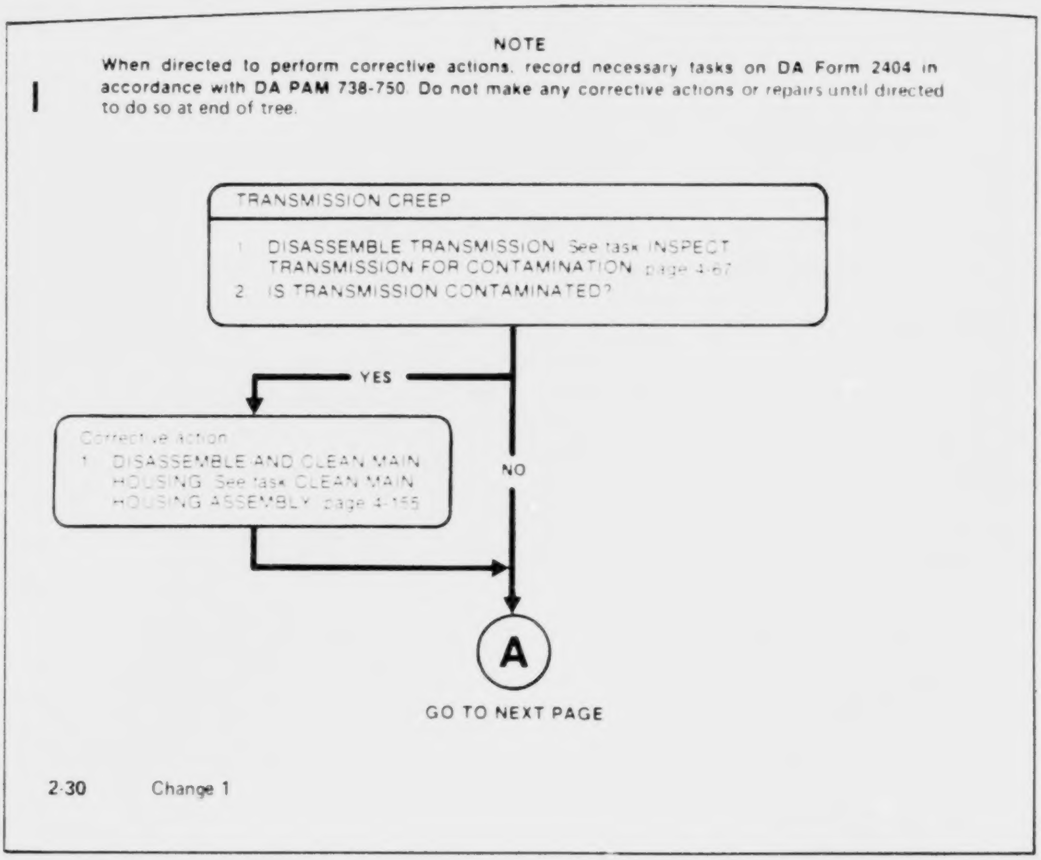
Equipment Conditions

Transmission mounted on tip-over stand
See page 2-144

HOW TO USE THIS MANUAL (cont)

Now you are ready to begin the inspection tree. Read the note carefully before starting. Look at the first block. Read step 1, which directs you to disassemble the transmission. Perform the **DISASSEMBLE** portion of the referenced task, INSPECT TRANSMISSION FOR CONTAMINATION, which starts on page 4-67. Return to this block when you have done step 1.

Step 2 is a question that you must answer YES or NO. The answer depends on what you found when you did step 1. For the purpose of this sample, you did not find any contamination. The answer to the question IS TRANSMISSION CONTAMINATED? is NO. Follow the NO arrow to the referenced letter Ⓐ. Follow the referenced letter Ⓐ to the next page.



NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.

TRANSMISSION CREEP

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

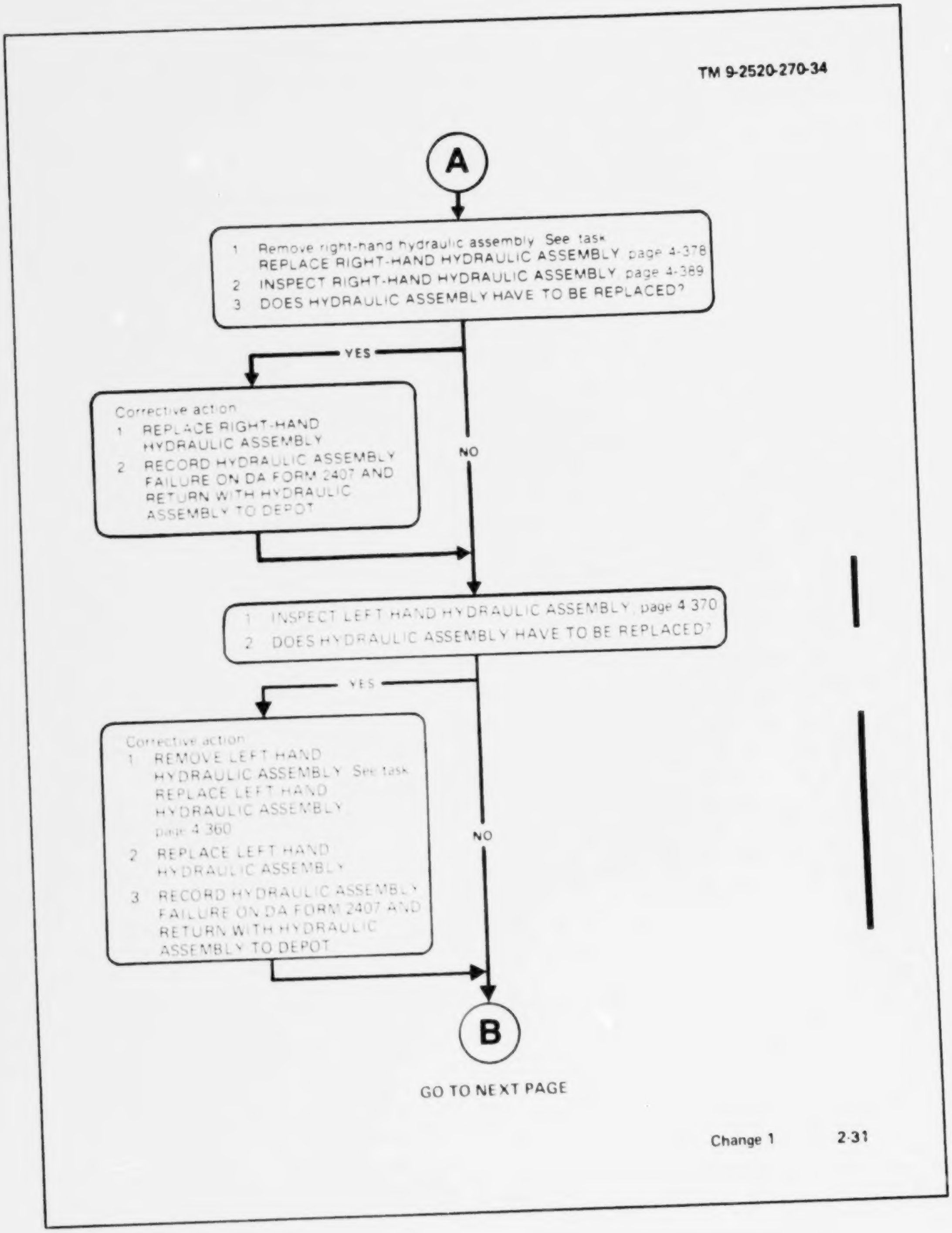
Corrective action

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

GO TO NEXT PAGE

2-30 Change 1

Here is the next page. Notice the referenced letter (A) at the top of the page. This matches the referenced letter (A) on the page before it. You are now in the right place in the inspection tree.



TM 9-2520-270-34

1 Remove right-hand hydraulic assembly See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY page 4-378
2 INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY page 4-389
3 DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action
1 REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY
2 RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT

1 INSPECT LEFT HAND HYDRAULIC ASSEMBLY page 4 370
2 DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action
1 REMOVE LEFT HAND HYDRAULIC ASSEMBLY See task REPLACE LEFT HAND HYDRAULIC ASSEMBLY page 4 360
2 REPLACE LEFT HAND HYDRAULIC ASSEMBLY
3 RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT

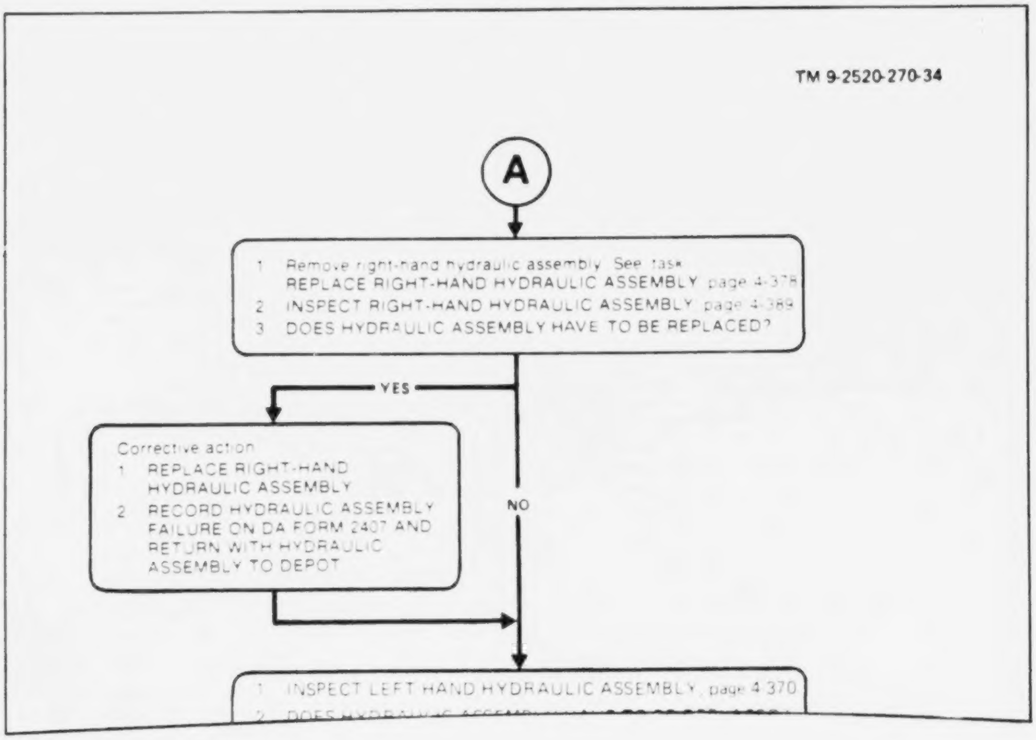
GO TO NEXT PAGE

Change 1 2-31

HOW TO USE THIS MANUAL (cont)

Read the first block of the page shown below. Do the steps in the block in order. For the purpose of this sample, you found a fault when you performed step 2. The answer to the question in step 3 is YES. Follow the YES arrow to the next block.

The YES arrow takes you to a corrective action block. Do not perform these actions until you are directed to do so at the end of the inspection tree. Record the corrective actions on DA FORM 2404. Return to the tree and follow the arrow to the next block.



TM 9-2520-270-34

1 Remove right-hand hydraulic assembly. See task
REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378
2 INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389
3 DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

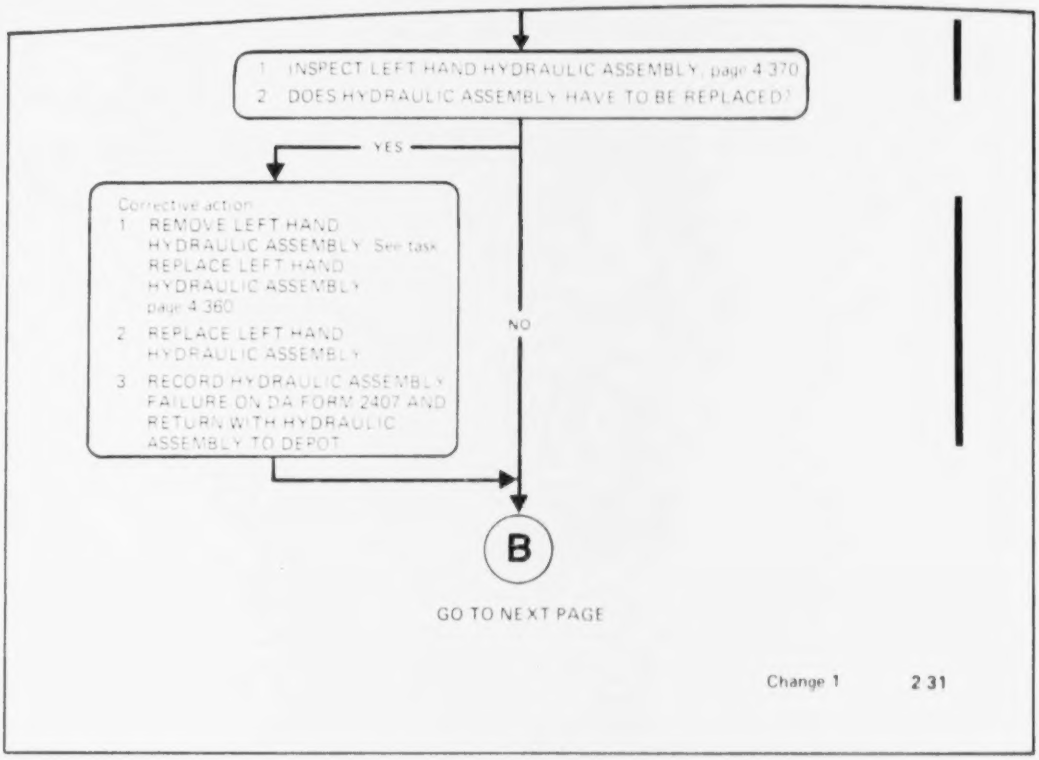
Corrective action
1 REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY
2 RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT

1 INSPECT LEFT HAND HYDRAULIC ASSEMBLY, page 4-370
2 DOES HYDRAULIC

(This page intentionally blank)

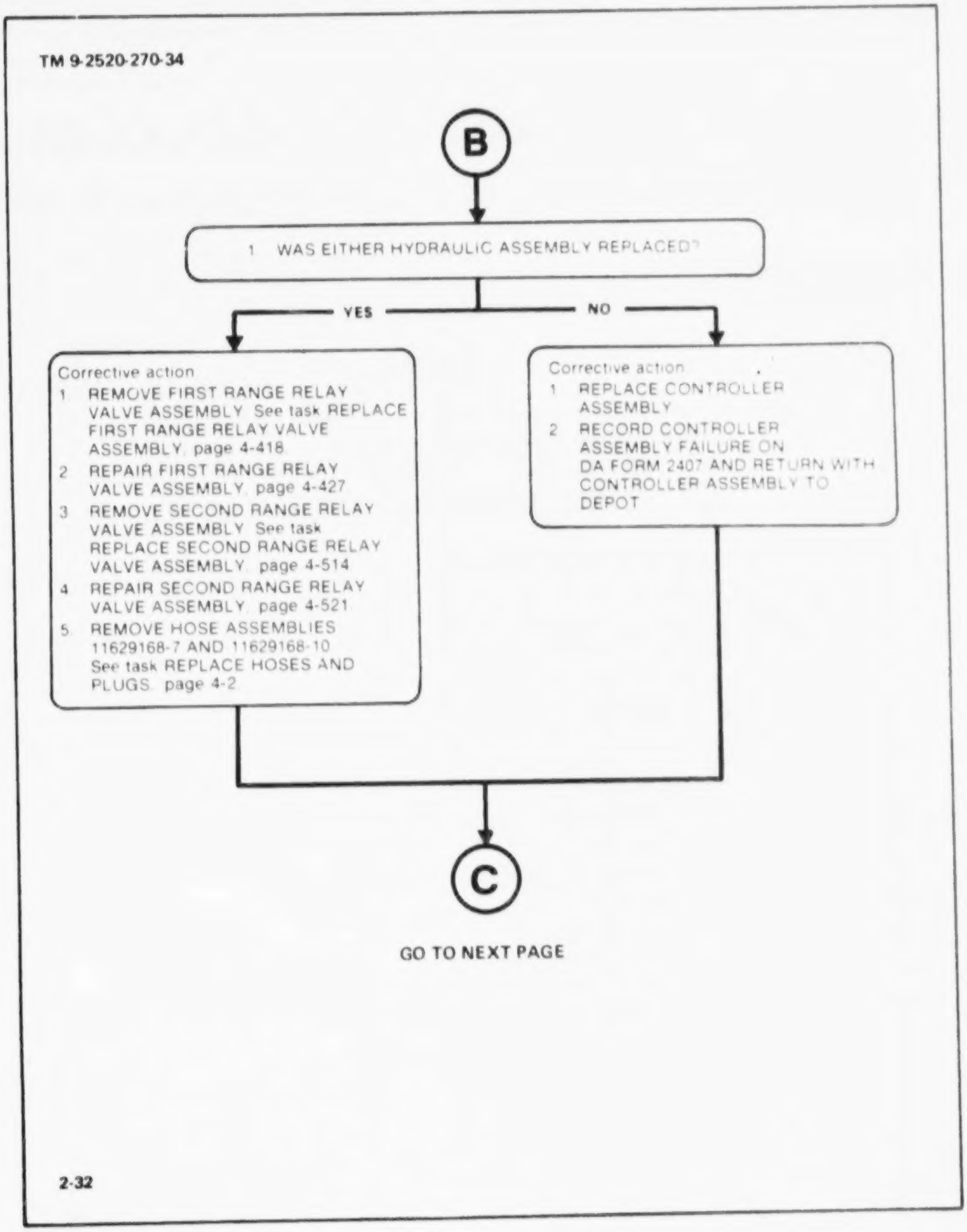
HOW TO USE THIS MANUAL (cont)

This is the block you return to in the inspection tree. Perform the first step and answer the question in step 2. For the purpose of this sample, you did not find a fault in the left-hand hydraulic assembly. Follow the NO arrow to the referenced letter Ⓑ. Follow the referenced letter Ⓑ to the next page.


1 INSPECT LEFT HAND HYDRAULIC ASSEMBLY, page 4-370
2 DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?
YES
Corrective action:
1 REMOVE LEFT HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT HAND HYDRAULIC ASSEMBLY page 4-360
2 REPLACE LEFT HAND HYDRAULIC ASSEMBLY
3 RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT
NO
B
GO TO NEXT PAGE
Change 1
2-31

Here is the next page. Notice the referenced letter Ⓑ at the top of the page. This matches the referenced letter Ⓑ on the page before it. You are now in the right place in the inspection tree.

Answer the question in the first block. Because you replaced a right-hand hydraulic assembly, the answer is YES. Follow the YES arrow to the next block. Continue to record corrective action on the same DA FORM 2404. Follow the referenced letter Ⓒ to the next page.



TM 9-2520-270-34

B

1 WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

YES

Corrective action

1 REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2 REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3 REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4 REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5 REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

Corrective action

1 REPLACE CONTROLLER ASSEMBLY.
2 RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER ASSEMBLY TO DEPOT.

C

GO TO NEXT PAGE

2-32

HOW TO USE THIS MANUAL (cont)

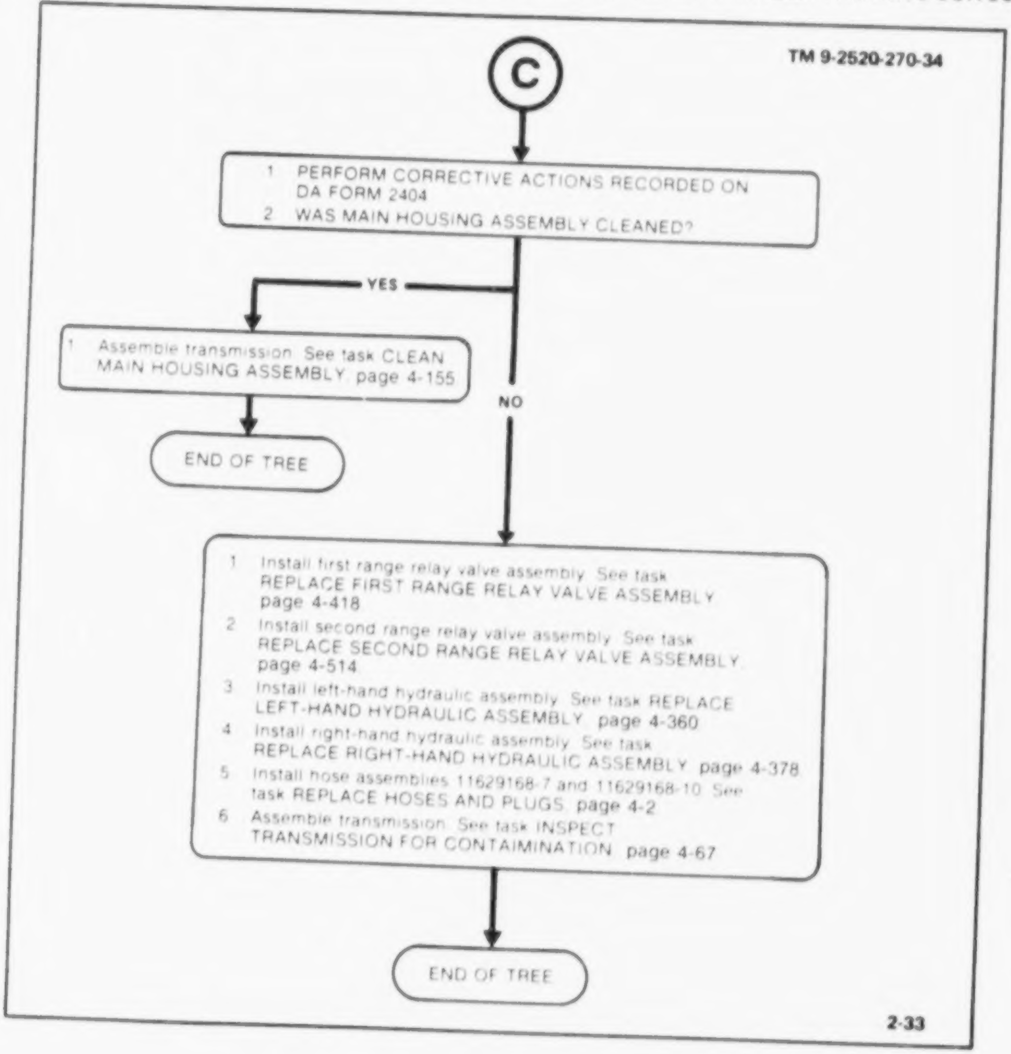
Here is the last page. Notice the referenced letter Ⓒ at the top of the page. This matches the referenced letter Ⓒ on the page before it. You are now in the right place in the inspection tree.

Step 1 in the first block tells you to perform the corrective actions recorded on DA FORM 2404. Notice that the first action on DA FORM 2404 requires that you obtain a new right-hand hydraulic assembly from supply. Do not install the assembly until you are directed to do so at some other point in the tree.

Complete DA FORM 2407 in accordance with DA PAM 738-750. When all corrective actions have been accomplished, forward the completed forms with the failed hydraulic assembly to depot.

Follow the arrow to the next block. Perform each step in order. Return to the tree at the end of each step.

When you have completed the last step, follow the arrow to END OF TREE. You have corrected the fault.



1 PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404
2 WAS MAIN HOUSING ASSEMBLY CLEANED?

1 Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155

1 Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY page 4-418
2 Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514
3 Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360
4 Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378
5 Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2
6 Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAIMINATION, page 4-67

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

This manual is for use in performing Intermediate Direct and General Support Maintenance on the Hydromechanical Crossdrive Transmission, HMPT 500 and the transmission container assembly. For operational troubleshooting, tests, and adjustments, refer to the Unit Maintenance Manual TM 9-2350-252-20-1 and the System Manual TM 9-2350-252-34-1.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

PREPARATION FOR STORAGE OR SHIPMENT

See Chapter 2 of this manual for directions for preparing the transmission for storage or shipment in the container.

ADMINISTRATIVE STORAGE

See TM 740-90-1 for the requirements for administrative storage of Army materiel.

NOMENCLATURE CROSS REFERENCE LIST

This listing includes nomenclature cross references used in this manual.

COMMON NAME	*OFFICIAL NOMENCLATURE*
Breaker bar	Hinged handle
Container	Shipping/storage container
Dipstick	Liquid gage rod-cap
Drive wrench	Screw-thread inserter
Drive wrench	Insert wrench
Goggles	Safety glasses
Planetary gears	Matched spur gear set
Plastic-faced hammer	Inserted hammer face
Removal tool	Threaded insert remover
Removal tool	Screw-thread remover
Shaft seal	Metal seal ring
Sleeve bushing	Encased seal
Soap	Scrubbing soap
Spring scale	Spring resiliency tester
Swage tool	Insert tool swage
Swage tool	Insert swage
Tip-over stand	Overhaul stand
Transmission	Hydromechanical Crossdrive Transmission Model HMPT 500

REPORTING OF EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your transmission or container needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-Automotive Command, Attn: AMSTA-MP, Warren, MI. 48397-5000. A reply will be sent to you.

Section II. EQUIPMENT DESCRIPTION AND DATA

TRANSMISSION CHARACTERISTICS, CAPABILITIES, AND FEATURES

CHARACTERISTICS

- Delivers power to vehicle right and left-hand final drives.
- Provides steering for vehicle.

CAPABILITIES AND FEATURES

- Transmission output power varies with load with no interruption of shifting.
- Transmission provides variable steering ratio at all vehicle speeds. (Allows vehicle to turn smoothly without multiple steering corrections.)
- Oil cooler mounted on engine.
- All hydraulic components required for transmission operation, except oil cooler connections, are mounted inside transmission.
- All drive controls for braking, steering, and moving the vehicle are mechanically linked to transmission (reference TM 9-2350-252-20-1 and TM 9-1450-646-20-1).
- Transmission has mechanically actuated, oil cooled, multiple-disk type service brakes which permit braking of vehicle.
- Service brakes are used as parking brakes.

TRANSMISSION TABULATED DATA

Manufacturer	General Electric Company
Model	HMPT 500
Assembly Number	11629000
Type	Hydromechanical
Weight, Dry	1860 lbs (844 kg)
Weight, Wet	1965 lbs (892 kg)
Dimensions, Overall:	
Length (Engine mounting face to rear)	31.17 inches (79.17 cm)
Width	40.0 inches (101.6 cm)
Height	28.5 inches (72.39 cm)
Nameplate Location	Front surface

TRANSMISSION TABULATED DATA (cont)

Input Rating:	
Maximum Torque	1020 ft-lb (141 mkg)
Maximum Speed	2600 rpm
Maximum Power	500 hp
Output Rating:	
Nominal Torque	9200 ft-lb (1272 mkg)
Nominal Forward Speed	3100 rpm
Nominal Reverse Speed	600 rpm
Nominal Steering Torque per Side	5500 ft-lb (769 mkg)
Rotation:	
Input (Viewed from rear of transmission)	Clockwise
Outputs (Forward operation viewed from right side)	Clockwise
Drive Ranges (Manually selected in vehicle):	
Reverse	
Start	
Neutral (N)	
Pivot Steer	
Drive	
Low	
Tow Start	
Tow	
Brakes (Service, Parking)	Wet, multiplate, mechanically applied
Ratio Elements	Radial ball piston hydraulic pumps and motors
Gearing:	
Differential, Combining, and Output	Spur gear planetaries
Input	Spur and spiral bevel
Mounting:	
Rear Support	Input housing bolted to engine
Side Support	Trunnions at left and right output housings
Oil System:	
Input Driven Pump	2 gerotor elements
Tow Pump	1 gerotor element
Oil Specification Temperature:	
+10° to +125° F (-12.2 to 51.7° C)	MIL-L-2104 Grade 30
-70° to +20° F (-56.7 to —6.7° C)	MIL-L-46167
Shipping and Storage:	
All temperatures	MIL-L-21260 Grade 2
Oil Capacity (Less cooler circuit)	14 U.S. Gal (53 liters)
Oil Filter	11629578
Oil Filter Repair Kit	PN 5705228
Oil Temperature Normal (from cooler)	185-195° F (85 to 91° C)

TRANSMISSION TABULATED DATA (cont)

Gear Ratios:	
Forward	Infinitely variable, neutral to 0.83.1
Reverse	Infinitely variable, neutral to 4:1
Pressures (At 1500 rpm and 180° F (82.3° C)):	
Priority circuit	180 psi (1241 kPa)
Makeup Supply	120 to 150 psi (827 to 1034 kPa)
Auxiliary Supply	
No Load	0 psi (0 kPa)
Heavy Load	120 psi (827 kPa)

CONTAINER CHARACTERISTICS, CAPABILITIES, AND FEATURES

CHARACTERISTICS

- Provides protective two piece housing for transmission.
- Provides controlled environment during shipping and storage.

CAPABILITIES AND FEATURES

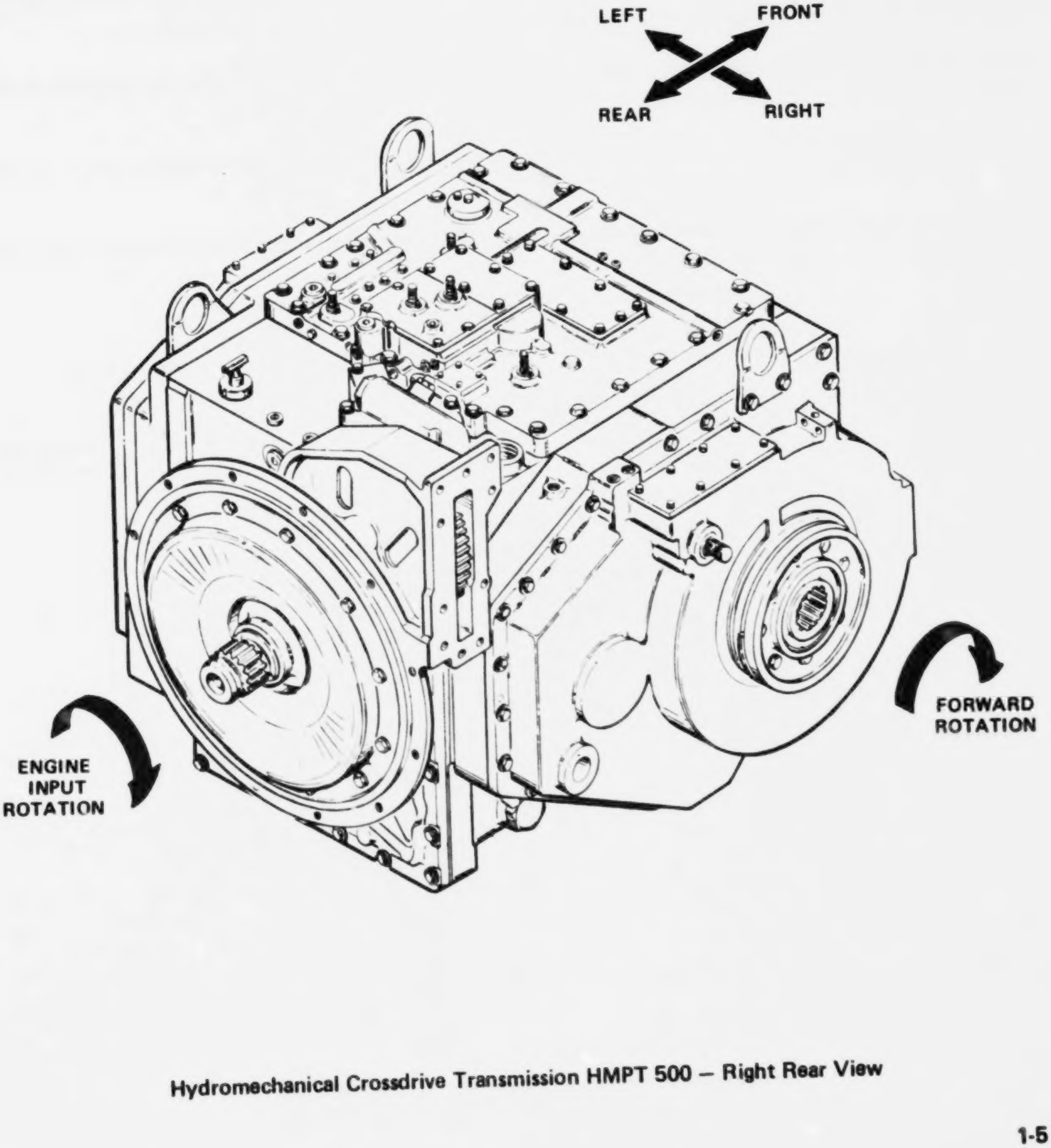
- Container is carbon steel with air and water tight seal.
- Internal frame on shock-mounts to secure transmission during handling.
- Exterior lifting points for container handling.
- Container is reusable with minimum maintenance.
- Humidity indicator indicates moisture content of interior.
- Transmission can be stored in container with no harmful effect from temperature.

CONTAINER TABULATED DATA

Manufacturer	Mancelona Metals Co.
Assembly Number	12298152
Type	Shipping/Storage
Weight	653 lbs (296.8 kg)
Dimensions, Overall:	
Length	54.62 inches (138.7 cm)
Width	51.00 inches (129.5 cm)
Height	41.09 inches (104.4 cm)
Nameplate Location	Front surface, upper half
Internal Moisture Control	64 desiccant units

DESCRIPTION AND LOCATION OF MAJOR COMPONENTS

TRANSMISSION ASSEMBLY. The transmission is shown below as a complete assembly removed from the vehicle. Directional terms are referenced looking toward the front of the transmission from the input shaft end (rear).


LEFT
FRONT
REAR
RIGHT
FORWARD ROTATION
ENGINE INPUT ROTATION

Hydromechanical Crossdrive Transmission HMPT 500 – Right Rear View

DESCRIPTION AND LOCATION OF MAJOR COMPONENTS (cont)

RANGE SELECTOR SHAFT. The range selector shaft transmits the operator input to set the transmission for tow, pivot steer, drive, neutral, or reverse.

DISCONNECT CLUTCH SHAFT. The disconnect clutch shaft transmits the operator input to engage and disengage the transmission and set it for low range.

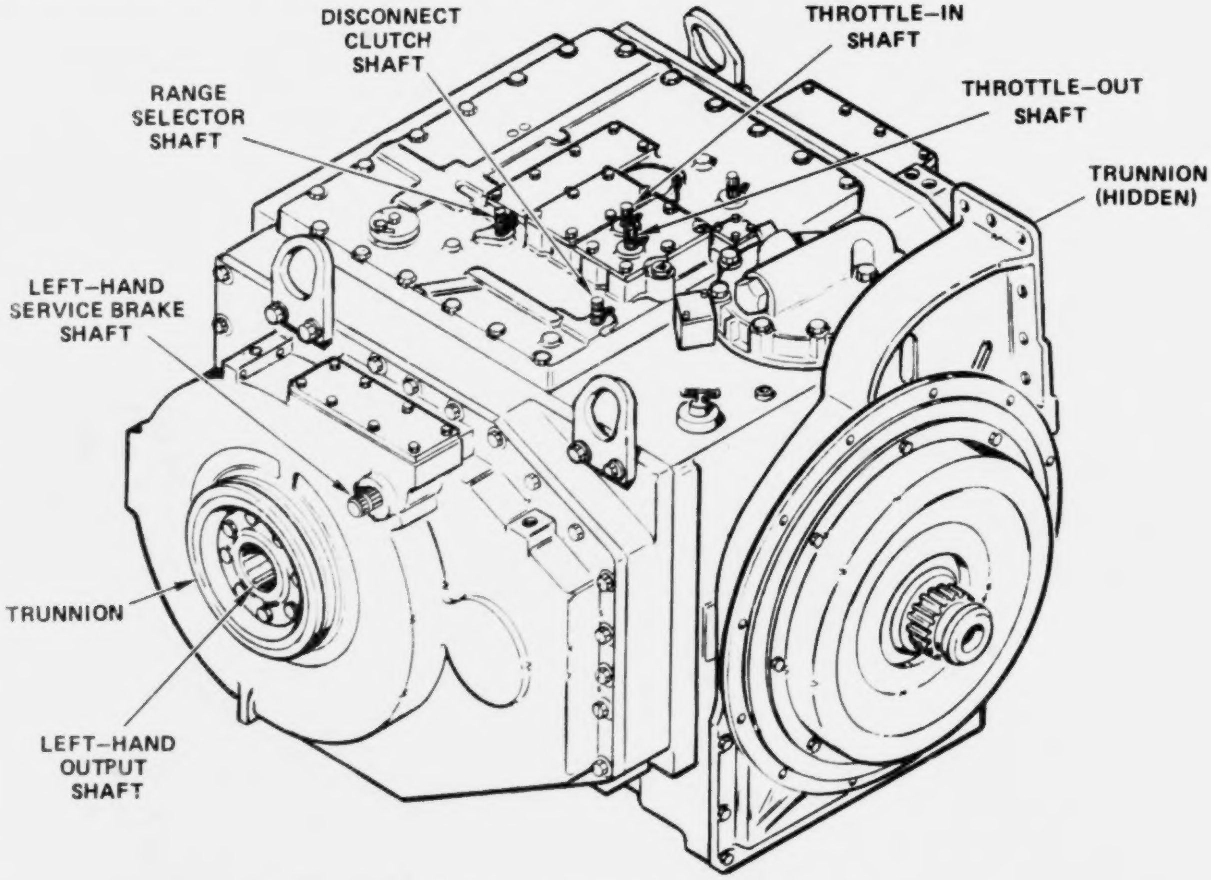
THROTTLE-IN SHAFT. The throttle-in shaft transmits the operator input to set the engine scheduling cams.

THROTTLE-OUT SHAFT. The throttle-out shaft changes the fuel input to the engine.

LEFT-HAND SERVICE BRAKE SHAFT. The left-hand service brake shaft transmits the operator input to the left-hand service brakes.

LEFT-HAND OUTPUT SHAFT. The left-hand output shaft transmits the transmission power to the vehicle left-hand final drive assembly.

TRUNNION. The trunnion is the raised ring on each of the output housings that provides transmission side support when mounted in vehicle.


DISCONNECT CLUTCH SHAFT
THROTTLE–IN SHAFT
RANGE SELECTOR SHAFT
THROTTLE–OUT SHAFT
TRUNNION (HIDDEN)
LEFT–HAND SERVICE BRAKE SHAFT
TRUNNION
LEFT–HAND OUTPUT SHAFT

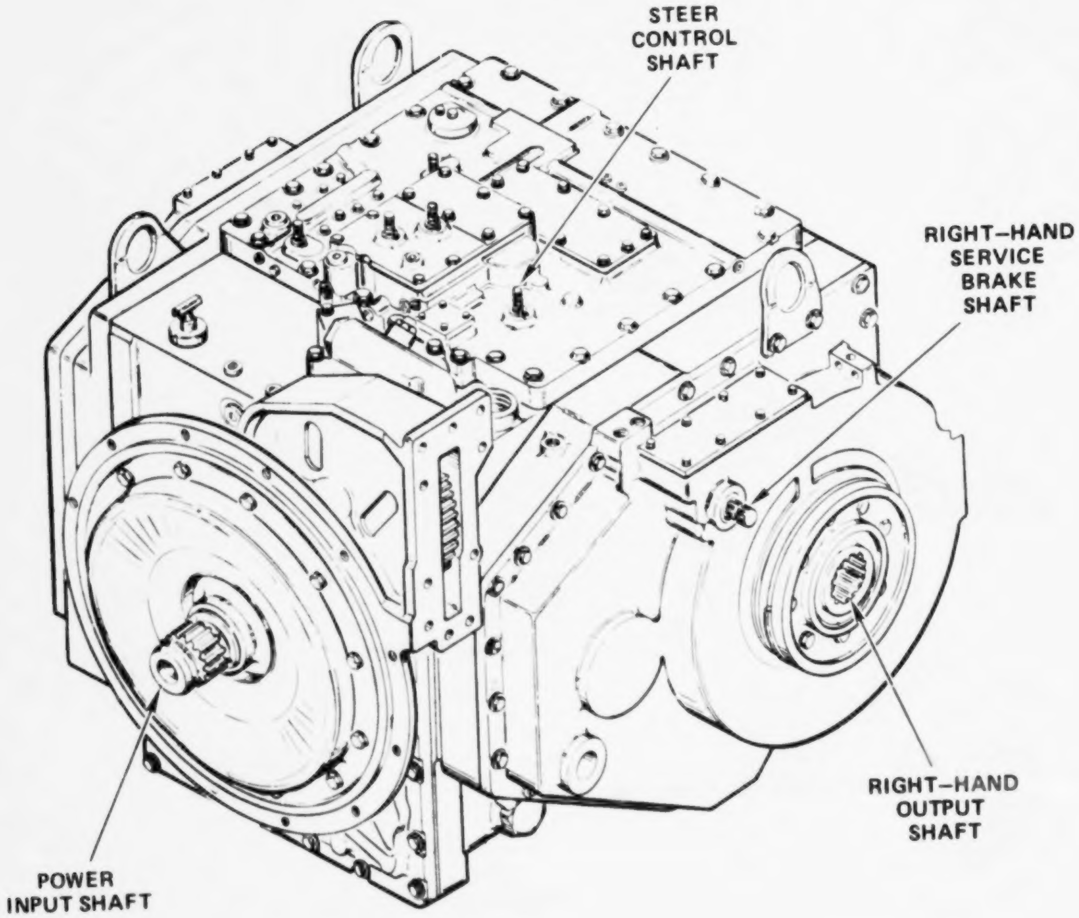
Transmission, External Connections – Left Rear View

STEER CONTROL SHAFT. The steer control shaft transmits the operator input for right or left turn.

RIGHT-HAND SERVICE BRAKE SHAFT. The right-hand service brake shaft transmits the operator input to the right-hand service brakes.

RIGHT-HAND OUTPUT SHAFT. The right-hand output shaft transmits transmission power to the vehicle right-hand final drive assembly.

POWER INPUT SHAFT. The power input shaft transmits engine power to drive the transmission.


STEER CONTROL SHAFT
RIGHT–HAND SERVICE BRAKE SHAFT
RIGHT–HAND OUTPUT SHAFT
POWER INPUT SHAFT

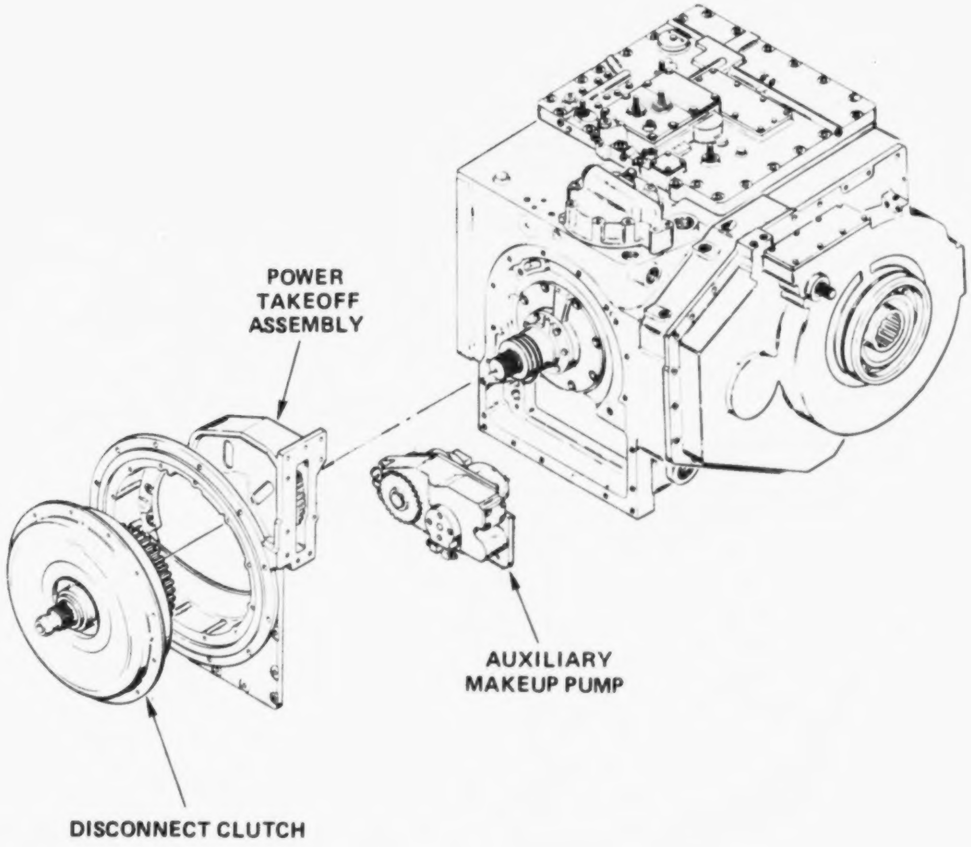
Transmission, External Connections – Right Rear View

DESCRIPTION AND LOCATION OF MAJOR COMPONENTS (cont)

DISCONNECT CLUTCH. The disconnect clutch transmits engine torque to the transmission input bevel gear assembly.

POWER TAKEOFF ASSEMBLY. The power takeoff assembly transmits power to drive the vehicle d.c. generator and the engine cooling fan.

AUXILIARY MAKEUP PUMP. The auxiliary makeup pump supplies oil to the controller for governing functions. This pump also supplies oil to the lubricating lines and hydraulic units. In addition, the auxiliary makeup pump supplies additional oil pressure under heavy load conditions.



Transmission, Main Internal Parts – Right Rear View (Sheet 1 of 2)

STRAIGHT (STEER) SHAFT. The steer shaft transmits power from the right-hand spur gear assembly thru the steer differential carrier assembly to the spur gearshaft.

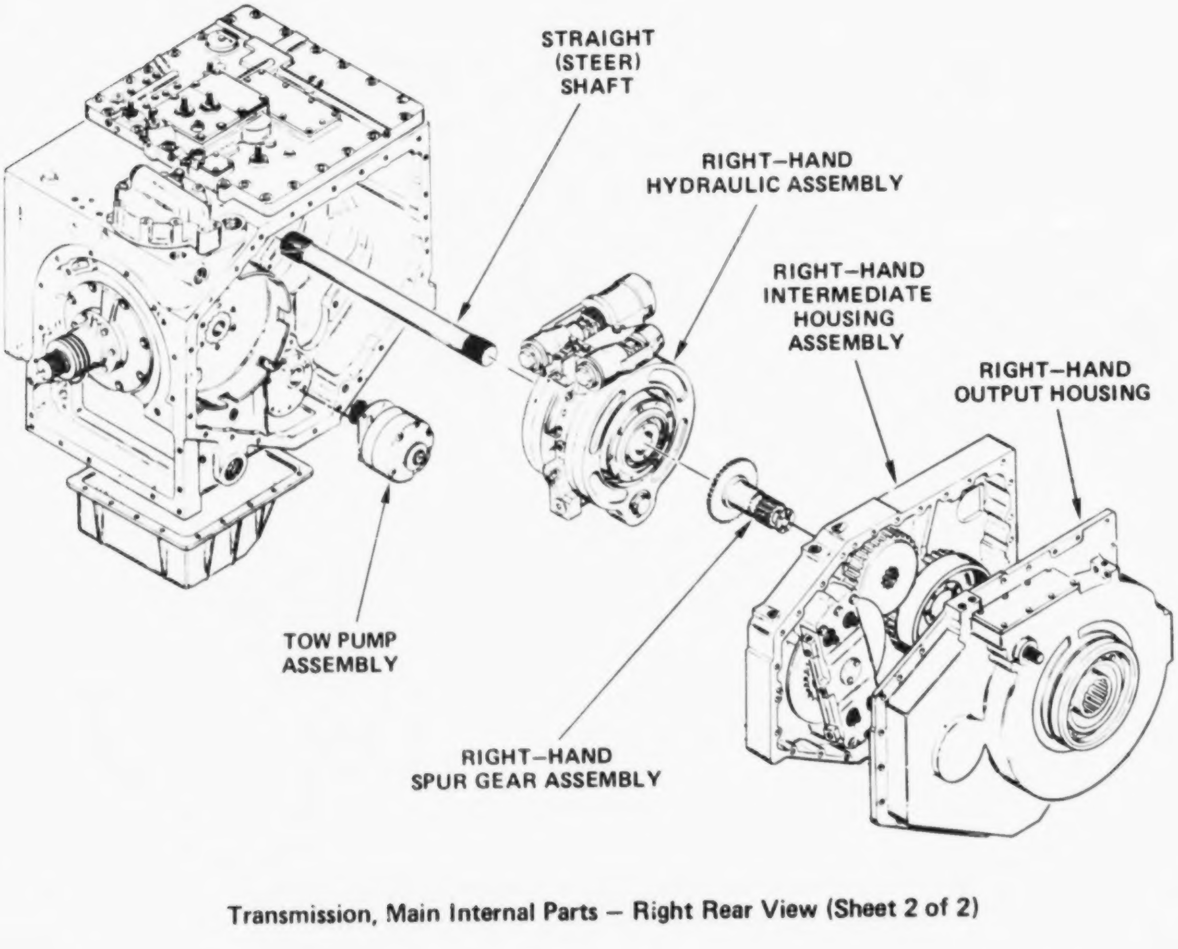
RIGHT-HAND HYDRAULIC ASSEMBLY. The right-hand hydraulic assembly drives the right-hand output shaft at variable speeds and directions.

RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. The right-hand intermediate housing assembly supports the right-hand output housing and contains the third range clutch assembly, single disk brake, and gearing.

RIGHT-HAND OUTPUT HOUSING. The right-hand output housing contains the output carrier assembly and service brake plates.

RIGHT-HAND SPUR GEAR ASSEMBLY. The right-hand spur gear assembly transmits power from the right-hand hydraulic assembly to the steer shaft and the output carrier assembly (right transmission output spline).

TOW PUMP ASSEMBLY. The tow pump assembly provides lubricating oil when the transmission is operated in push start and tow ranges.


STRAIGHT (STEER) SHAFT
RIGHT–HAND HYDRAULIC ASSEMBLY
RIGHT–HAND INTERMEDIATE HOUSING ASSEMBLY
RIGHT–HAND OUTPUT HOUSING
TOW PUMP ASSEMBLY
RIGHT–HAND SPUR GEAR ASSEMBLY

Transmission, Main Internal Parts – Right Rear View (Sheet 2 of 2)

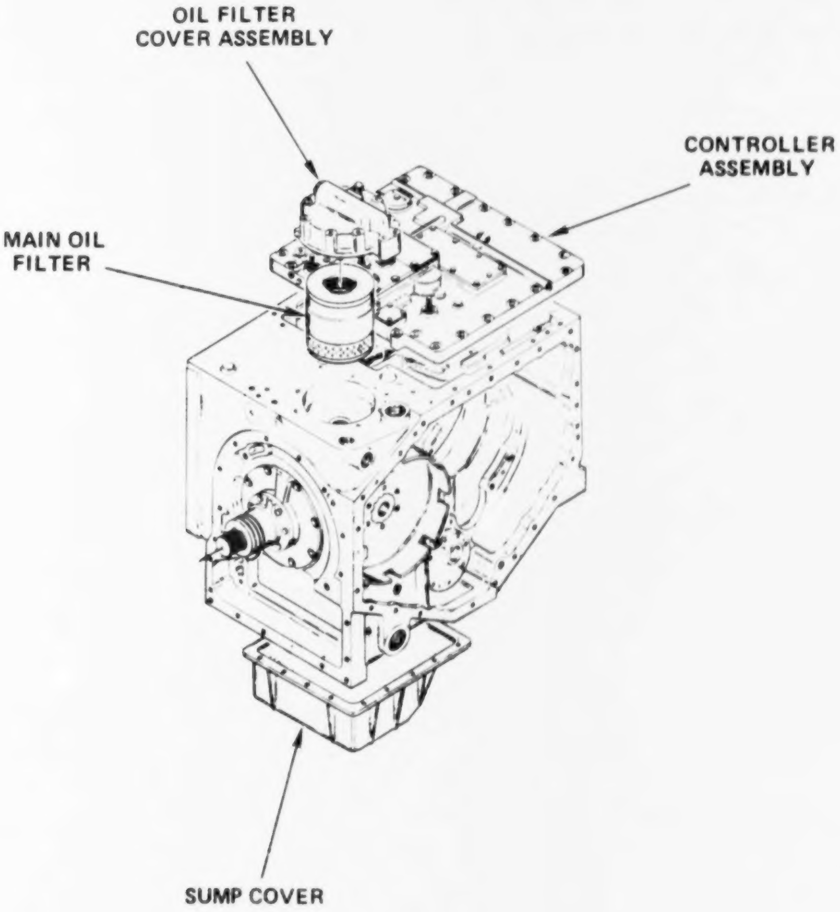
DESCRIPTION AND LOCATION OF MAJOR COMPONENTS (cont)

MAIN OIL FILTER. The main oil filter filters the transmission lubricating oil.

OIL FILTER COVER ASSEMBLY. The oil filter cover assembly secures the oil filter. It contains the oil filter pressure indicator.

CONTROLLER ASSEMBLY. The controller assembly serves as the top cover and contains various valves, cams, and actuating devices that control transmission operation.

SUMP COVER. The sump cover covers and seals the bottom opening of the transmission, contains drain plugs, and serves as a reservoir for the oil pumps.


OIL FILTER COVER ASSEMBLY
CONTROLLER ASSEMBLY
MAIN OIL FILTER
SUMP COVER

Transmission, Top and Bottom Parts – Right Rear View

LEFT-HAND OUTPUT HOUSING. The left-hand output housing contains the output carrier assembly and service brake plates.

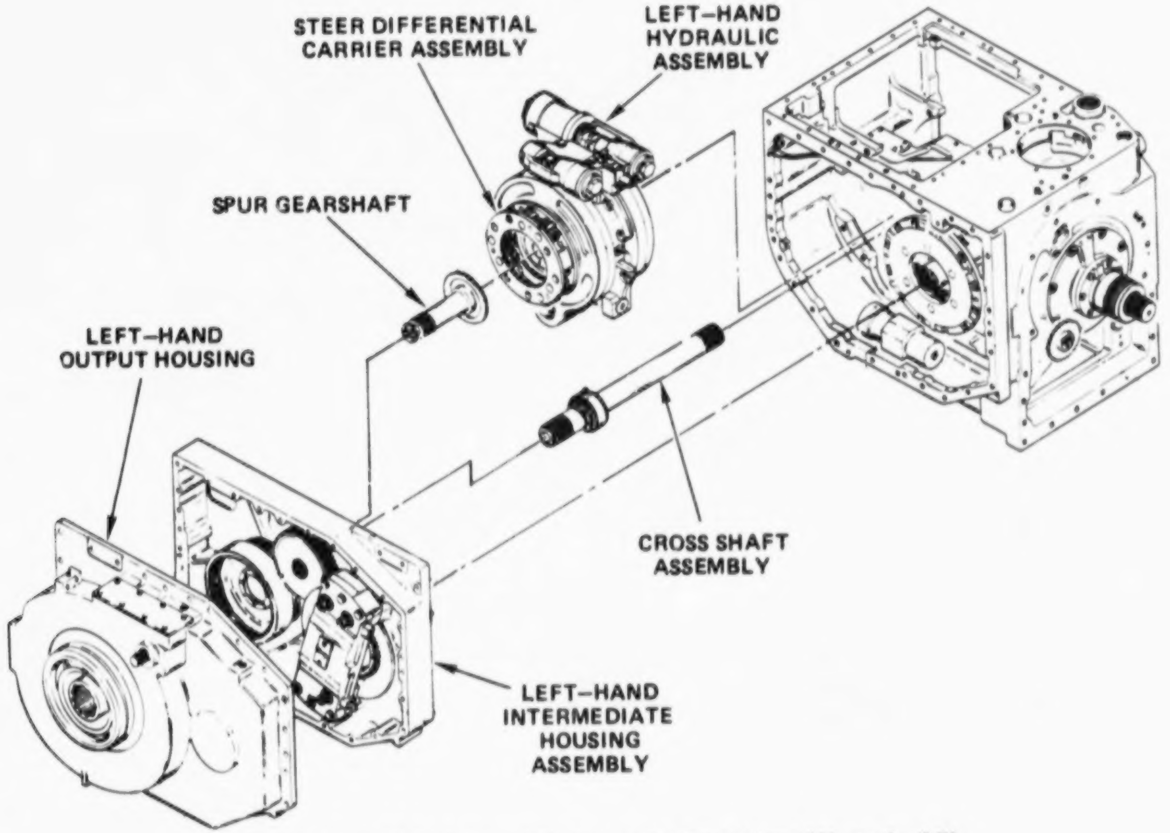
LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. The left-hand intermediate housing assembly supports the left-hand output housing and contains a single disk brake and gearing.

CROSS SHAFT ASSEMBLY. The cross shaft assembly transmits power between the left and right-hand sides of the transmission during second and third range operation.

SPUR GEARSHAFT. The spur gearshaft transmits power from the steer differential carrier assembly to the left-hand output carrier assembly (left transmission output spline).

STEER DIFFERENTIAL CARRIER ASSEMBLY. The steer differential carrier assembly averages the output speeds of two hydraulic assemblies. The internal spline drives the spur gearshaft (left transmission output spline).

LEFT-HAND HYDRAULIC ASSEMBLY. The left-hand hydraulic assembly drives the left output shaft at variable speeds and directions.


STEER DIFFERENTIAL CARRIER ASSEMBLY
LEFT-HAND HYDRAULIC ASSEMBLY
SPUR GEARSHAFT
LEFT-HAND OUTPUT HOUSING
CROSS SHAFT ASSEMBLY
LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY

Transmission, Main Internal Parts – Left Rear View (Sheet 1 of 2)

DESCRIPTION AND LOCATION OF MAJOR COMPONENTS (cont)

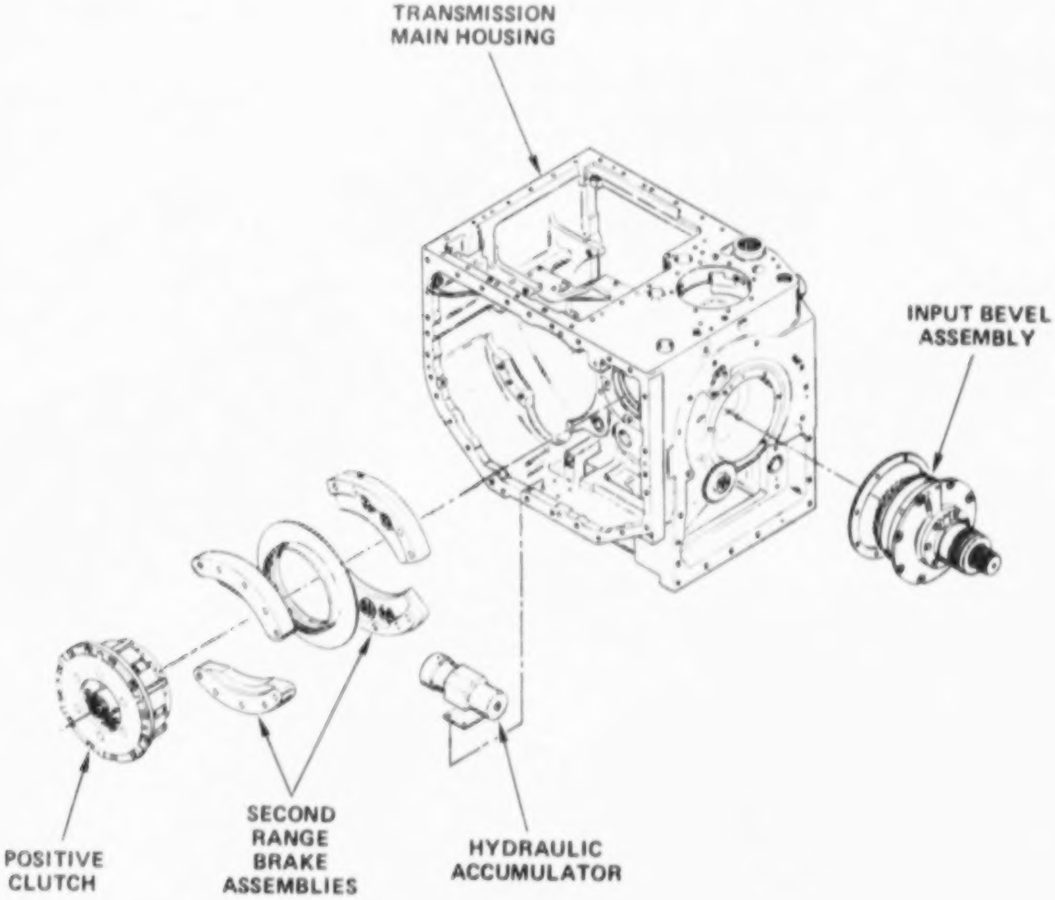
TRANSMISSION MAIN HOUSING. The transmission main housing supports the transmission assemblies and components.

INPUT BEVEL ASSEMBLY. The input bevel assembly transmits engine torque to the transmission.

HYDRAULIC ACCUMULATOR. The hydraulic accumulator ensures that the first range brake assembly has enough pressure at shift point.

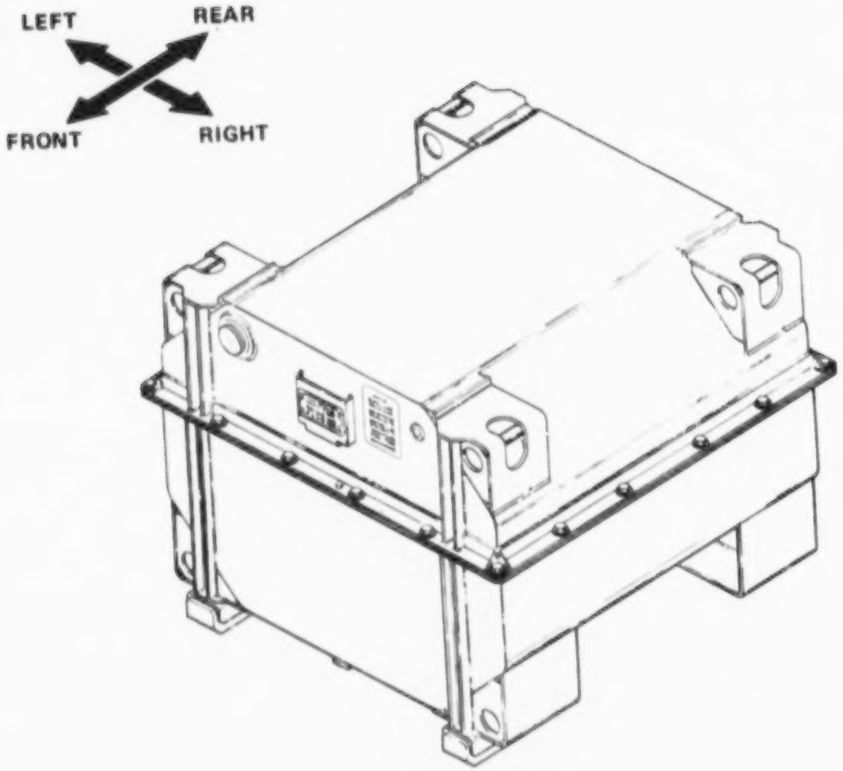
SECOND RANGE BRAKE ASSEMBLIES. When the brake is applied, the second range brake assemblies initiate second range operation of the positive clutch.

POSITIVE CLUTCH. The positive clutch transfers torque through the transmission during second range operation.


TRANSMISSION MAIN HOUSING
INPUT BEVEL ASSEMBLY
POSITIVE CLUTCH
SECOND RANGE BRAKE ASSEMBLIES
HYDRAULIC ACCUMULATOR

Transmission, Main Internal Parts – Left Rear View (Sheet 2 of 2)

SHIPPING/STORAGE CONTAINER. The container is shown below as a completely assembled container. Directional terms are referenced looking toward the front of the container.



Shipping/Storage Container

DESCRIPTION AND LOCATION OF MAJOR COMPONENTS (cont)

LOWER CONTAINER. The lower container contains the frame and mounts supporting the transmission.

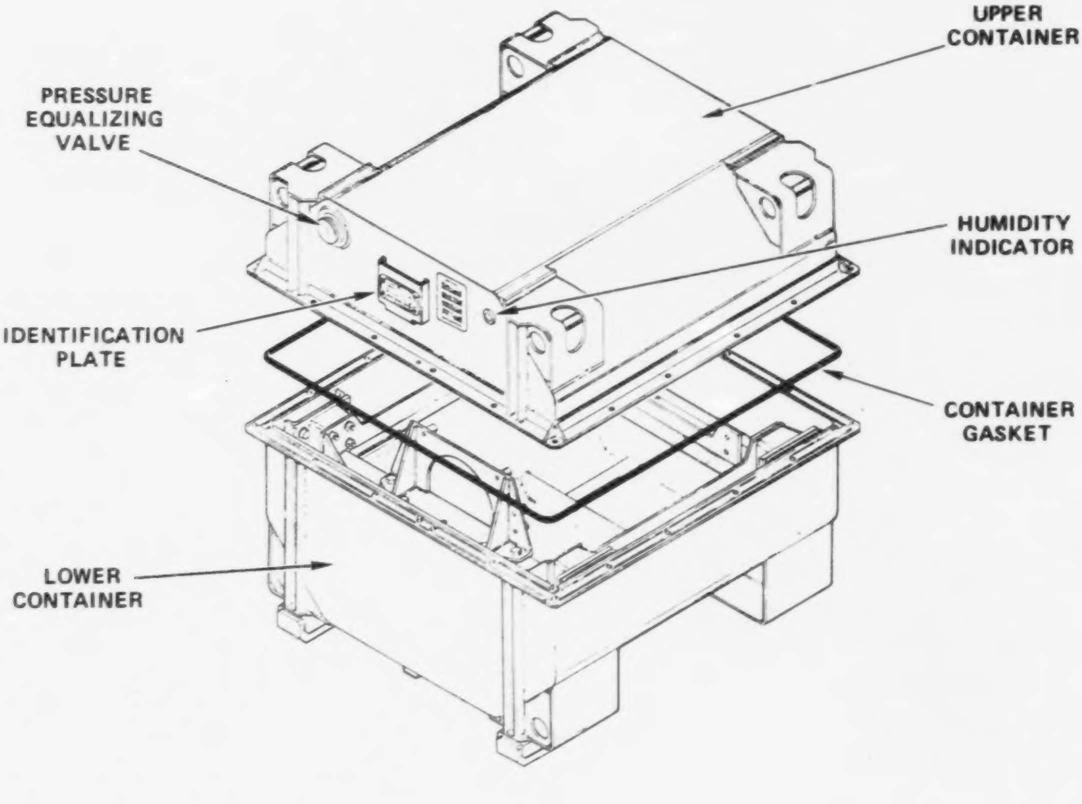
UPPER CONTAINER. The upper container contains the identification plate, humidity indicator, and pressure equalizing valve.

CONTAINER GASKET. The container gasket is located on the lower container and ensures the water and air-tight seal of the two container halves.

HUMIDITY INDICATOR. The humidity indicator is located on the front of the upper container and shows the moisture content within the container.

PRESSURE EQUALIZING VALVE. The pressure equalizing valve is located on the front of the upper container and allows venting of internal container pressure before opening.

IDENTIFICATION PLATE. The identification plate is located on the front of the upper container and identifies the container and the container contents.


UPPER CONTAINER
PRESSURE EQUALIZING VALVE
HUMIDITY INDICATOR
IDENTIFICATION PLATE
CONTAINER GASKET
LOWER CONTAINER

Shipping/Storage Container External Components

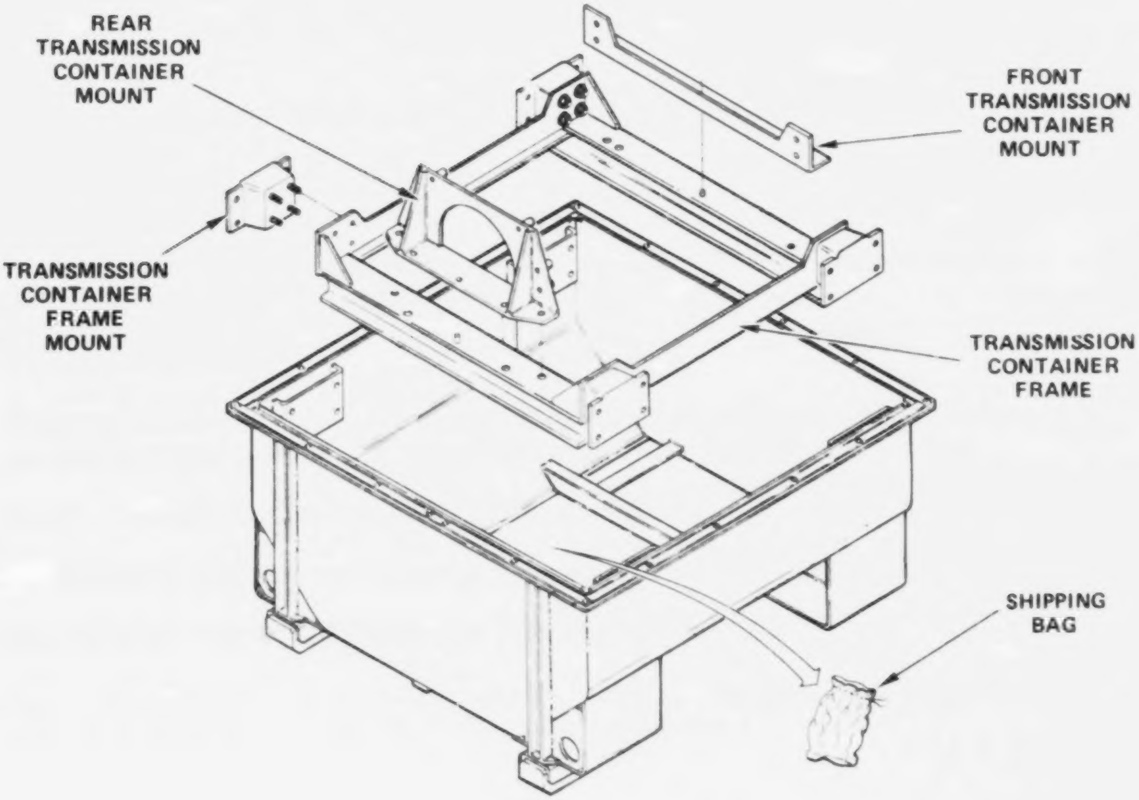
SHIPPING BAG. The shipping bag is located in the lower container and contains all screws, flat washers and lock washers for installing front and rear transmission container mounts to transmission container frame and transmission.

TRANSMISSION CONTAINER FRAME MOUNT. The transmission container frame mounts are rubber pads to absorb shock; preventing damage to the transmission.

REAR TRANSMISSION CONTAINER MOUNT. The rear transmission container mount secures the rear of the transmission to the front of the container frame.

FRONT TRANSMISSION CONTAINER MOUNT. The front transmission container mount secures the front of the transmission to the rear of the container frame.

TRANSMISSION CONTAINER FRAME. The transmission container frame is used to hold the transmission in place within the container.


REAR TRANSMISSION CONTAINER MOUNT
FRONT TRANSMISSION CONTAINER MOUNT
TRANSMISSION CONTAINER FRAME MOUNT
TRANSMISSION CONTAINER FRAME
SHIPPING BAG

Shipping/Storage Container Internal Components

CHAPTER 2

GENERAL MAINTENANCE PROCEDURES

Section I. REPAIR PARTS, SPECIAL TOOLS, AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

Standard and commonly used tools and equipment which are used on the transmission and container are authorized for issue by Table of Allowance (TA) and Tables of Organization and Equipment (TOE).

SPECIAL TOOLS AND SUPPORT EQUIPMENT

See TM 9-2520-270-34P for lists and illustrations of special tools and support equipment needed to maintain the transmission and container.

REPAIR PARTS

Repair parts are listed and illustrated in TM 9-2520-270-34P. This is your authority for ordering replacement parts.

Section II. SERVICE UPON RECEIPT

INSPECTION

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

EQUIPMENT CHECK

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

Check to see whether the equipment has been modified.

Be sure proper maintenance forms are complete and with the transmission.

PREPARING THE TRANSMISSION FOR MAINTENANCE

Before starting any transmission maintenance, install the transmission on a tip-over stand. See task PREPARE TRANSMISSION FOR SERVICING, page **2-144.**

Section III. GENERAL MAINTENANCE INSTRUCTIONS

SCOPE

This section contains general preparation, cleaning, inspection, repair, and fault isolation. Perform these procedures during disassembly, repair, and assembly of the transmission , the container, and their parts.

PREPARATION

a. *GENERAL.* To prepare the transmission for maintenance, certain steps and precautions must be followed. They are detailed in steps b thru e following.

b. *PERSONNEL SAFETY.* To ensure safety of personnel, proper care should be exercised when handling the transmission and its subassemblies and parts. Many subassemblies are heavy. Assistance of another person, lifting device, or other support equipment is needed to manipulate them. Personnel should not try to handle heavy parts by hand. Ensure that all lifting devices are in good working order. Personnel should remove wrist watches, rings, identification bracelets, etc. Safety glasses (goggles) should be worn to protect the eyes.

c. *EQUIPMENT.* Obtain the proper equipment before beginning disassembly. This equipment includes: a suitable lifting device with at least 1 1/2-ton capacity, a transmission tip-over stand, proper hand tools and special tools, receptacles for small parts, a work table, wood blocks, oil-soluble grease, and wiping cloths. See chapter 2, section V, for tools, equipment, and parts.

d. *HANDLING TECHNIQUES.* Avoid damage to transmission and container parts and subassemblies during the disassembly, cleaning, inspection, repair, and assembly procedures. Nicks, scratches, and dents caused by careless handling can cause oil leakage or improper functioning. This could result in a transmission failure. Replace or repair all defective parts.

When servicing the transmission, care must be used to protect it against contamination. Dirt, small tools, and parts could fall into access holes and cavities. This could result in a transmission failure. When a transmission is not being serviced, protect it from contamination.

e. *TORQUING.* When torquing is required, the specific torque requirements are indicated in the task relating to the specific part.

CLEANING

a. *GENERAL.* Procedures for cleaning will be the same for most transmission and container parts. General cleaning procedures are detailed in steps b thru h following. Special cleaning procedures are covered in the task relating to the specific part.

b. *CLEANING INSTRUCTIONS.* Care is needed in all cleaning procedures. Foreign matter such as dirt and metal chips in the transmission could damage parts, cause malfunctions, and interfere with accurate measurements. When you perform any cleaning procedure, do the following:

(1) Inspect all air and fluid openings, lines, and hoses. Make sure they are capped.

WARNING

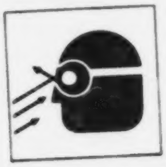
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

(2) Clean all parts before inspections, checks, after repair, and before assembly. Use cleaning solvent (Item 1, App B) or approved cleaner. Remove gum, varnish, and sealant compound by soaking parts in cleaning solvent and scrubbing with a soft bristle brush. Clean thoroughy to remove any dirt and residue. Dry parts with wiping rag (Item 13, App B).

(3) Keep hands free of grease; grease collects dirt.

(4) Except where specified, never use abrasives, files, scrapers, wire brushes, or sharp tools on surfaces where the finish is important to the operation or sealing of parts.

WARNING



Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

(5) Dry clean parts immediately with compressed air and apply a thin film of clean oil to prevent rusting. Never use lye or caustic solutions that will corrode or etch metal surfaces.

(6) Clean and apply lubricant in new bearings. Refer to TM 9-214 for detailed lubrication and cleaning procedures. Bearings that have been in service should be relubricated.

(7) After cleaning, cover and wrap parts to protect from dirt.

c. *CASTINGS, FORGINGS, AND MACHINED SURFACES.*

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

(1) Clean inner and outer surfaces of casting with cleaning solvent (Item 1, App B). Dry casting with compressed air.

(2) Remove sludge and gum deposits with a soft bristle brush.

(3) Blow out all tapped holes with compressed air.

CAUTION

Do not touch oil screens with wire probes. Damage to equipment can occur

d. *OIL PASSAGES AND SCREENS.*

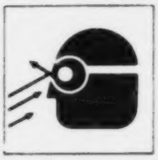
(1) Make sure all oil inlets, outlets and passages are free of obstructions.

(2) Clean all oil inlets, outlets and passages with soft wire (brass or copper) probes to break up any sludge or gum deposits.

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

WARNING



Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

(3) Flush all oil inlets, outlets, passages, and screens with cleaning solvent (Item 1, App B). Dry parts with compressed air.

e. *OIL SEALS AND FLEXIBLE HOSES.*

CAUTION

Cleaning solvent causes leather, rubber, and synthetic materials to become brittle. Do not use cleaning solvent to clean seals and flexible hoses.

(1) Clean seals and flexible hoses with soap (Item 10, App B) and water. Dry parts with wiping rag (Item 13, App B).

(2) Flush all hoses with clean transmission oil and blow out with compressed air.

f. *BEARINGS.* Bearings require special cleaning techniques. See TM 9-214 for cleaning and maintenance procedures for roller bearings, needle roller bearings, and ball bearings.

g. *THREADED PARTS AND INSERTS.*

WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

Blow out insert holes with compressed air.

h. *SHAFTS AND SPINDLES.*

WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

Remove obstructions with compressed air or by probing with soft wire.

INSPECTION

a. *GENERAL.* Procedures for inspection will be the same for most transmission and container parts. General inspection procedures are detailed in steps b thru v following. Special inspection procedures are covered in the task relating to the specific part.

b. *CASTINGS, FORGINGS, AND MACHINED SURFACES.*

(1) Use magnetic particle inspection equipment to check ferrous castings for cracks. Use magnifying glass and a strong light to check nonferrous castings for cracks. Check areas next to studs, threaded inserts, sharp corners, and fillets.

(2) Inspect machined surfaces for nicks, burrs, and raised metal. Mark damaged areas for repair.

(3) Use straightedge to check all mounting flanges on housings and supports for bends. Inspect mating flanges for strains, which could indicate oil leakage.

(4) Inspect all plug and tapped openings for damaged or stripped threads.

c. *OIL PASSAGES.* Inspect all oil passages for obstructions and dirt.

d. *BEARINGS.* Inspect bearings. See TM 9-214 for inspection procedures for roller bearings, needle roller bearings, and ball bearings.

e. *BUSHINGS AND BUSHING-TYPE BEARINGS.*

(1) Check all bushings and bushing-type bearings for secure fit in casting. Check for color changes which could indicate overheating.

(2) Check for dirt in oil holes and in bushing-type bearings. Oil holes and grooves must be clean and not damaged.

f. *THRUST WASHERS AND SHIMS.* Inspect thrust washers and shims for wear, distortion, scores, nicks, and burrs.

g. *GEARS.* Inspect gears for burrs, wear, cracked or broken teeth, and pitting at tooth contact areas. Inspect the mating gear of any defective gear.

h. *OIL SEALS, PREFORMED PACKINGS, AND REUSEABLE GASKETS.*

(1) Inspect hook-type metallic seal rings for wear, distortion, cracks, and broken hooks. Ensure that edges of hook ring are square.

(2) Inspect gaskets, composition-type seals, rings, and packings for wear, brittleness, cracks, cuts, deformation, and deterioration.

(3) Inspect lip seals for cracks, wear, cuts, and brittleness. Inspect springs and seal shells for deformation and cracks.

(4) Inspect feather edge of oil seals for tears, fraying, hardening, and cracking.

(5) Replace metal-covered oil seals when inspection indicates damage or oil leakage.

i. *SPLINED PARTS.* Inspect splined parts for burrs, wear, and twisted, cracked or broken splines.

j. *CLUTCH AND BRAKE PLATES.*

(1) Inspect nonmetallic plates for uneven or excessive wear, cracks, breaks, deep scoring, and warpage.

(2) Inspect steel plates for burrs, scoring, uneven or excessive wear, distortion, discoloration (evidence of heating), embedded metal particles, severly pitted faces, galling, cracks, breaks, damaged spline teeth, and warpage.

k. *INSERTS.*

(1) Inspect inserts for cracks and stripped or damaged threads.

(2) Check inserts for loose fit.

l. *SNAP RINGS.* Inspect snap rings for nicks, burrs, distortion, loss of tension, and wear.

m. *SPRINGS.*

(1) Inspect springs for wear, distortion, breaks, and discoloration (evidence of overheating).

(2) Use indicator caliper to check spring length. Physical specifications are contained in the task relating to the specific part.

n. *SHAFTS AND SPINDLES.* Inspect shafts and spindles for excessive wear, binding, scoring, cracks, burrs, and obstructed oil passages.

o. *BALL VALVES.*

(1) Inspect steel balls for rust, pitting, or grooving.

(2) Inspect ball seats for scoring, pitting, or damage.

p. *SLIDE VALVES.*

(1) Inspect slide valves and housing for wear, burrs, scoring, and evidence of sticking. Ensure that slide valves move freely within their housing.

WARNING

Sharp edges can cut hands.
Use rags or brush to lubricate.

(2) Inspect slide valve lands. All edges should be square and sharp. Do not damage these sharp edges during cleaning or repair operations.

q. *HOSES.*

(1) Inspect hoses for cuts, breaks, or abrasions in the wire-braided covering.

(2) Inspect hoses covered by plastic tubing for breaks.

(3) Inspect hose fittings for leakage or twisting of the hoses in their assembled positions.

(4) Inspect hoses connected to 45° or 90° hose to boss elbows for kinking caused by incorrect elbow position.

r. *ADAPTERS AND HOSE TO BOSS ELBOWS.*

(1) Inspect adapters and elbows for leakage or damaged threads.

(2) Inspect adapters and elbows for damaged or extruded preformed packings caused by excessive torque when tightening adapters or elbows.

(3) Inspect adapter and elbow seats for scoring, pitting, or corrosion.

s. *PLUGS.*

(1) Inspect plugs for leakage or damaged threads.

(2) Inspect plugs for damaged or extruded preformed packings caused by excessive torque when tightening plugs.

(3) Inspect plug seats for scoring, pitting, or corrosion.

t. *CYLINDER BLOCK BALLS.*

(1) Inspect cylinder block balls, one at a time, visually and physically by lightly sliding your fingernail over any suspect area.

(2) A ball is acceptable if the following surface conditions are present:

(a) Extremely fine lines or very light smudge-like marks that are random in pattern and cannot be felt.

(b) A dull or frosty appearance which is uniform in nature.

(3) A ball is defective if one of the following surface conditions is present:

(a) Any nick, chip, burr or discoloration (evidence of heating).

(b) A dull or frosty appearance which is a circular band.

(c) Any line can be felt by using your fingernail.

u. *CYLINDER BLOCK BALL RACE.*

(1) Inspect concave surface of race for scratches, digs, discoloration (evidence of heating), scuff marks, and skid marks.

v. *CYLINDER BLOCK BALL RACE TANG.*

(1) Inspect the race tang for severe discoloration (evidence of heating) on the sides and end of the tang.

(2) Inspect the working surface of the race tang for pits, holes, or other evidence that metal has been removed or fallen out. Also look for cracks in the peened or welded area.

REPAIR

a. *GENERAL.* Procedures for repair will be the same for most transmission and container parts. General repair procedures are detailed in steps b thru p following. Special repair procedures are covered in the task relating to the specific part. After repair, clean all parts well to keep metal chips or abrasives out of the working parts of the transmission.

b. *CASTINGS.*

(1) Replace all cracked castings or any part with defects that cannot be corrected or which will impair transmission operation.

(2) Repair minor damage to machined surfaces of castings with crocus cloth (Item 2, App B) or soft honing stone. Pay particular attention to gasket surfaces.

(3) Repair minor surface bends by working bent surface of casting across sheet of crocus cloth (Item 2, App B) on surface plate. Replace bent castings which may impair assembly or operation.

(4) Repair damaged screw threads with correct tap or die.

c. *BEARINGS.*

(1) See TM 9-214 for inspection and maintenance procedures for roller bearings, needle roller bearings, and ball bearings.

(2) Replace any bearing if defects are found.

d. *BUSHINGS AND BUSHING-TYPE BEARINGS.* Replace bushings and bushing-type bearings if they are loose, discolored due to overheating, or scored. When you replace bushings and bushing-type bearings, check nearby parts for damage or unusual wear.

(1) *Removal.* Press out bushing or bushing-type bearing with suitable arbor press or with special tools provided.

(2) *Installation.* Clean repaired parts before assembly or installation. Aline bushing or bushing-type bearing in casting or retaining cage. Press bushing or bushing-type bearing into place with suitable arbor press or with special tools provided.

e. *THRUST WASHERS AND SHIMS.*

(1) Remove minor defects with a crocus cloth (Item 2, App B) or soft honing stone.

(2) Replace parts that are worn, scored, nicked, or deformed.

f. *OIL SEALS.* Oil seals must be replaced when thin feather edge is damaged or when seal material is brittle.

(1) *Removal.* Press damaged oil seal from casting. Be careful not to damage bore.

(2) *Repair.*

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

When oil seal bore is damaged so an oil-tight seal is impossible, replace casting, elbow, or adapter. Remove slight nicks, burrs, and scratches with crocus cloth (Item 2, App B) dipped in cleaning solvent (Item 1, App B).

(3) *Installation.* Install new oil seal in casting bore or on elbow or adapter using suitable oil seal replacement tool.

g. *PREFORMED PACKINGS AND GASKETS.* When directed within a step to remove and discard preformed packings and gaskets, replace all that are removed. Do not reuse them.

h. *GEARS.*

(1) Replace gears that have worn, pitted, or galled teeth.

(2) Remove sharp burrs from gear teeth with a soft honing stone.

i. *SPLINED PARTS.*

(1) Replace parts that are excessively worn or have twisted, cracked, or broken splines.

(2) Remove burrs with a soft honing stone.

j. *DISCONNECT CLUTCH, THIRD-RANGE CLUTCH, AND SERVICE BRAKE PLATES.*

(1) Replace defective plates.

(2) Remove burrs and minor surface irregularities from steel plates with a soft honing stone.

k. *THREADED PARTS.*

(1) Replace all parts that have stripped threads. Replace parts that cannot be repaired by chasing threads with a used tap or die. Replace parts that cannot be repaired by installing insert. See insert replacement procedures in this chapter.

(2) Chase damaged threads with used tap or die of correct size. If possible, worn tap or die should be used because new tap may cut oversize and new die may cut undersize.

l. *INSERTS.* Replace insert when threads are stripped or when insert is cracked or loose. Do not chase inserts. See insert replacement procedures in this chapter.

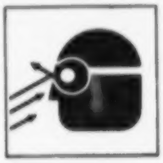
m. *SNAP RINGS.* Replace defective snap rings.

n. *SPRINGS.* Discard defective springs. Length inspection data, where needed, is given in maintenance procedures.

o. *SHAFTS AND SPINDLES.*

(1) Replace defective parts.

WARNING



Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

(2) Remove burrs and minor surface irregularities with a crocus cloth (Item 2, App B) or soft honing stone. Remove obstructions with compressed air or by probing with soft wire.

p. *BALL VALVES.* Replace parts in which ball seats are damaged.

REPAIR STANDARDS

Repair standards are included in the tasks where needed. The minimum and key clearances for new and repaired parts are included. Limits which indicate when a part should be replaced are included. These clearances and limits will allow maximum service with minimum replacement. Normally, parts not worn beyond the dimensions given in the task step will be approved for service.

FAULT ISOLATION

a. *GENERAL.* Procedures for locating and repairing transmission faults will be the same for most failures. General procedures are explained below. Detailed information is provided in the individual inspection trees.

b. *FAULT SYMPTOMS.* Read DA Form 2407 which comes with the failed transmission before beginning any fault isolation. The fault symptom(s) recorded on DA Form 2407 provides an entry to the correct inspection tree.

c. *FAULT SYMPTOM INDEX.* Start any fault isolation procedure by looking up the fault symptom in the fault symptom index. This is the only way to determine which inspection tree or task to use.

d. *INSPECTION TREES.* Use the inspection tree for performing fault isolation procedures. Never skip blocks in the inspection trees. They may contain important inspections or procedures. Never assume that there is just one failed component or assembly. Make sure you complete the tree.

e. *TASKS.* Perform all tasks directed by the inspection tree. They contain important checks, inspections, and cleaning procedures. They also contain detailed steps to repair failed assemblies.

f. *FAULT DOCUMENTATION.* Complete all fault documentation referenced in the inspection tree.

(1) Record all deficiencies or shortcomings on DA Form 2404 to be sure no repairs are overlooked. Record all required corrective actions so that you or another person can make repairs.

(2) Fill out a DA Form 2407 when you return an assembly to the depot. The information you provide will assist them in making repairs. Include all important facts.

Section IV. INSPECTION TREES

FAULT SYMPTOM INDEX

Symptom or Deficiency (From DA Form 2407)	Inspection Tree/(Task)	Page
Delay at first to second range shift point	NO ACCELERATION IN SECOND RANGE	2-34
Disconnect clutch failure	VEHICLE STEERS IN NEUTRAL	2-138
Engine stalls during braking	ENGINE STALLS DURING BRAKING	2-96
Engine stalls when transmission is engaged	FROZEN INPUT	2-83
Low makeup pressure	LOW MAKEUP PRESSURE	2-47
Neutral creep	TRANSMISSION CREEP	2-30
No acceleration in second range	NO ACCELERATION IN SECOND RANGE	2-34
No acceleration in third range	NO ACCELERATION IN THIRD RANGE	2-103
No back problem	NO PROPULSION, WITH STEER	2-118
No input to transmission	NO INPUT TO TRANSMISSION	2-14
No propulsion, no steer	NO PROPULSION, NO STEER	2-129
No speed reference signal	NO PROPULSION, WITH STEER	2-118
Poor acceleration	NO ACCELERATION IN SECOND RANGE	2-34
Rollback problem	TRANSMISSION ROLLBACK	2-74
Service brake problem with brake coolant test failed	SERVICE BRAKE FAILURE	2-25
Service brake problem with brake coolant test passed	SERVICE BRAKE FAILURE	2-25
Transmission contaminated	CLEAN MAIN HOUSING ASSEMBLY (TASK)	4-155
Vehicle moves forward or backward in pivot-steer	NO FULL STEER	2-65
Vehicle moves in pivot-steer with steering yoke centered	TRANSMISSION CREEP	2-30
Weak left hydraulic assembly	NO FULL STEER	2-65
Weak right hydraulic assembly	NO FULL STEER	2-65

NO INPUT TO TRANSMISSION

DESCRIPTION

This tree covers inspection for a fault causing no input to transmission and for making repairs when the fault is found.

INITIAL SETUP

Tools:

- Drag wrench – (Item 24, App C)
- General mechanic's tool kit: automotive (Item 33, App C)
- Socket wrench adapter – (Item 74, App C)
- Torque wrench – (Item 99, App C)

Materials/Parts:

- Wood block (2) – (Item 6, App D)

Personnel Required:

Track Veh Rep 63H10
Helper

References:

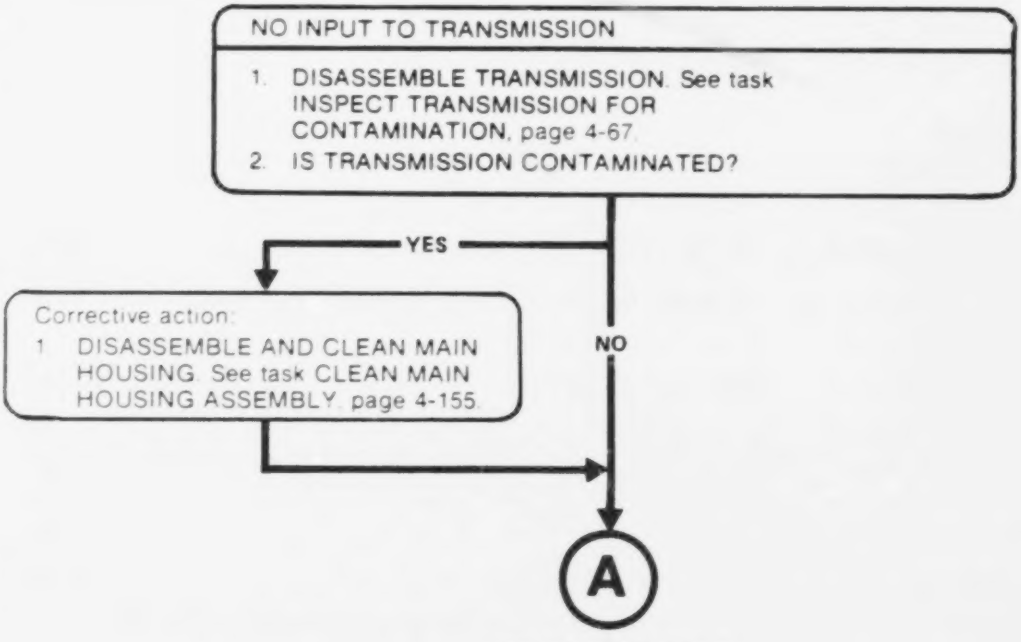
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



NO INPUT TO TRANSMISSION

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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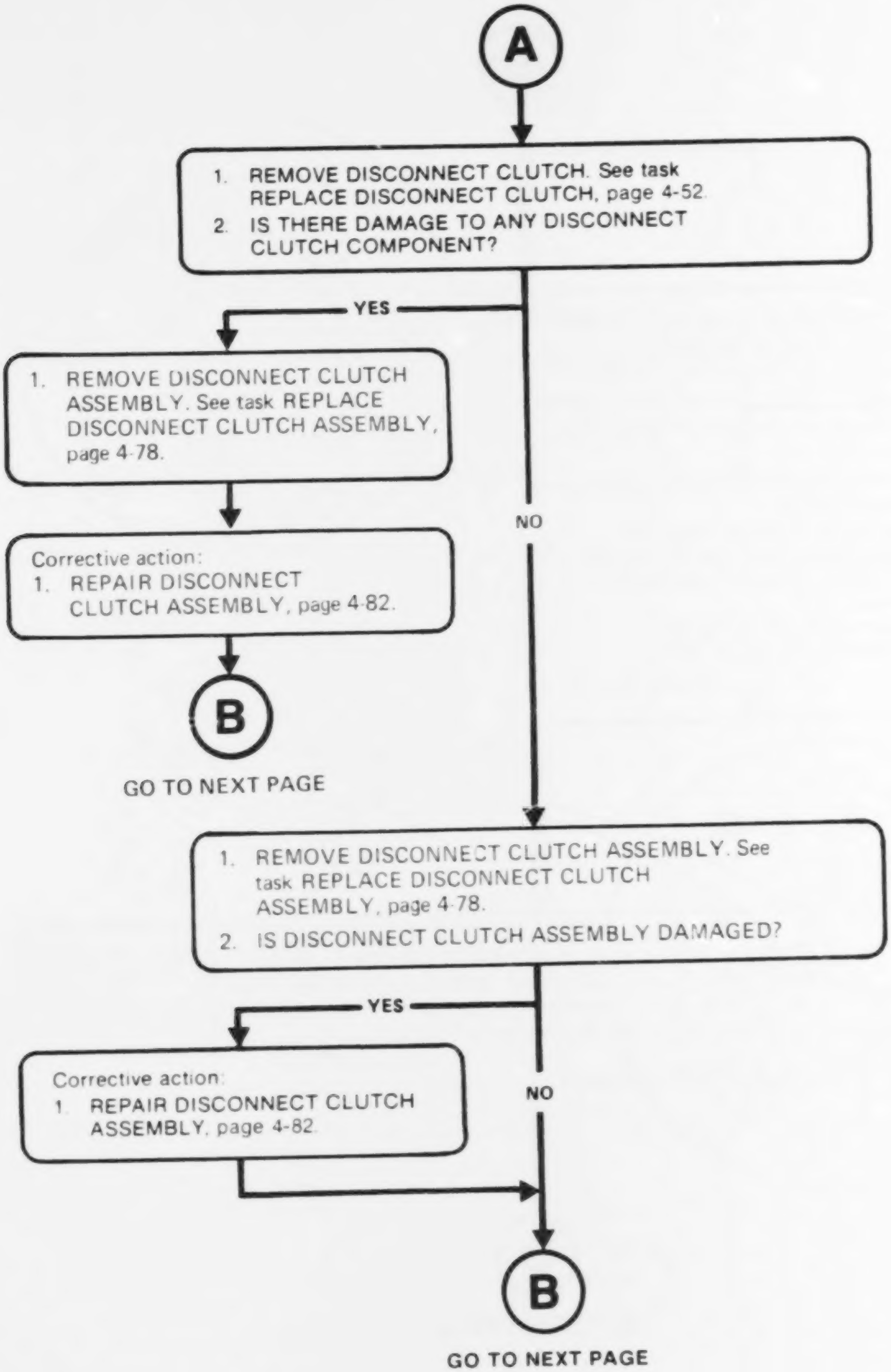

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. IS THERE DAMAGE TO ANY DISCONNECT CLUTCH COMPONENT?

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

GO TO NEXT PAGE

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. IS DISCONNECT CLUTCH ASSEMBLY DAMAGED?

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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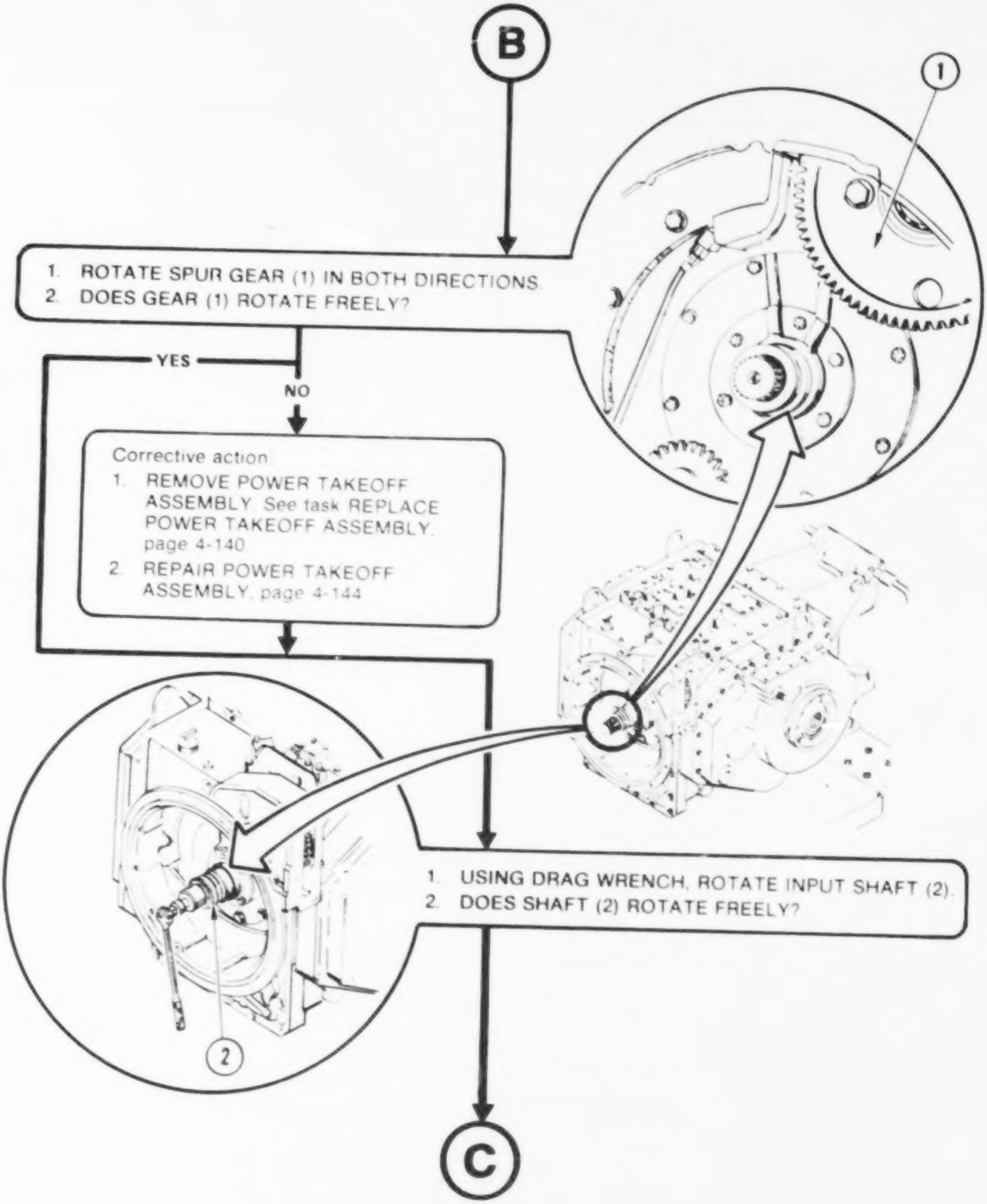

1. ROTATE SPUR GEAR (1) IN BOTH DIRECTIONS.
2. DOES GEAR (1) ROTATE FREELY?

YES

NO

Corrective action:

1. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. REPAIR POWER TAKEOFF ASSEMBLY, page 4-144.

1. USING DRAG WRENCH, ROTATE INPUT SHAFT (2).
2. DOES SHAFT (2) ROTATE FREELY?

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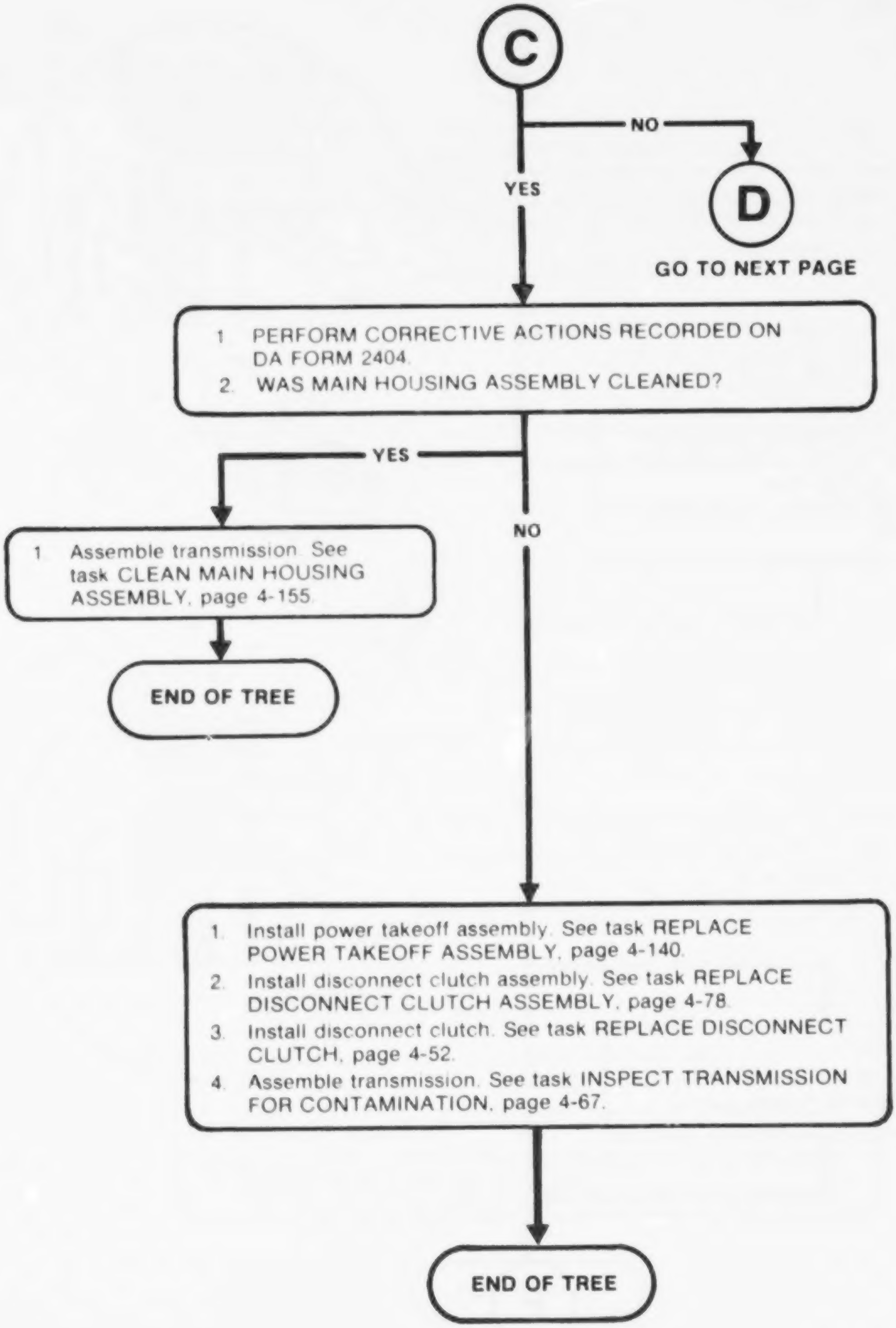


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
4. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

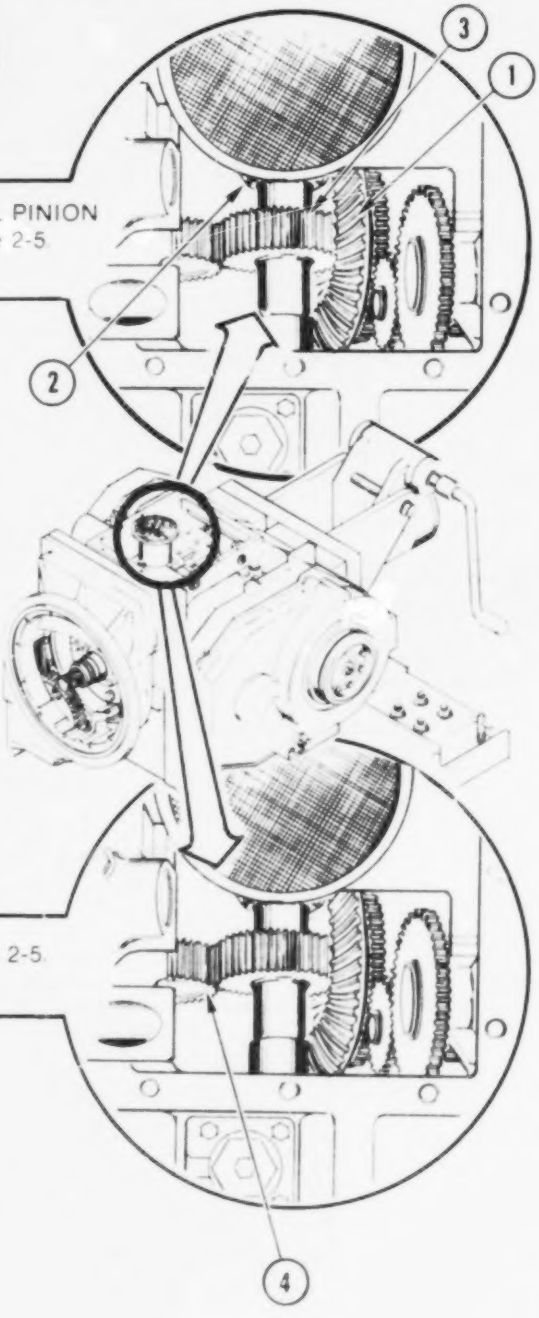
D

1. INSPECT INPUT BEVEL GEAR (1), SPIRAL BEVEL PINION GEAR (2), AND SPUR GEARSHAFT (3). See page 2-5.
2. IS ANY GEAR DAMAGED?

YES

Corrective action:
1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.

NO



1. INSPECT INPUT IDLER SPUR GEAR (4). See page 2-5.
2. IS GEAR (4) DAMAGED?

YES

Corrective action:
1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

NO

E

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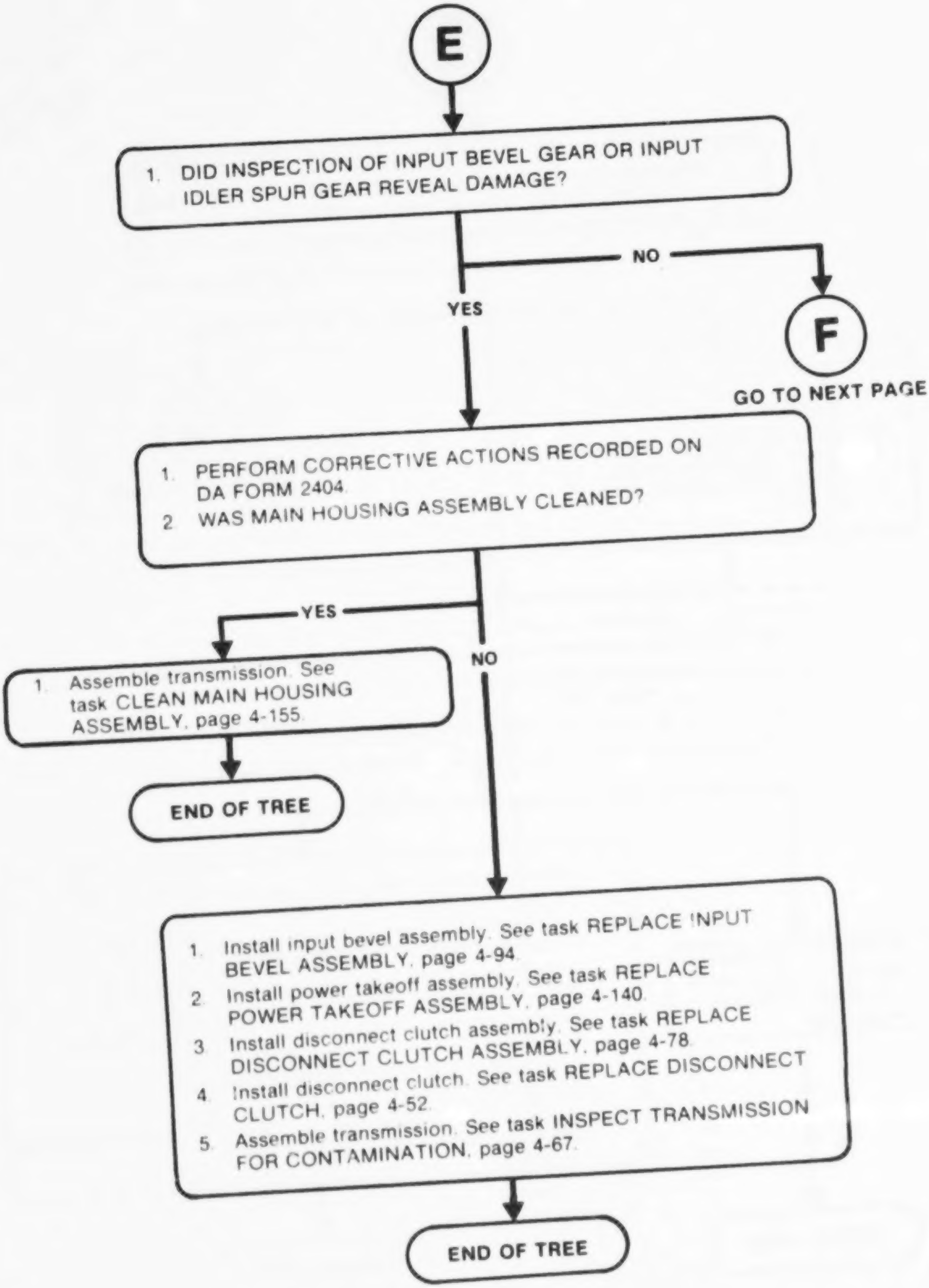
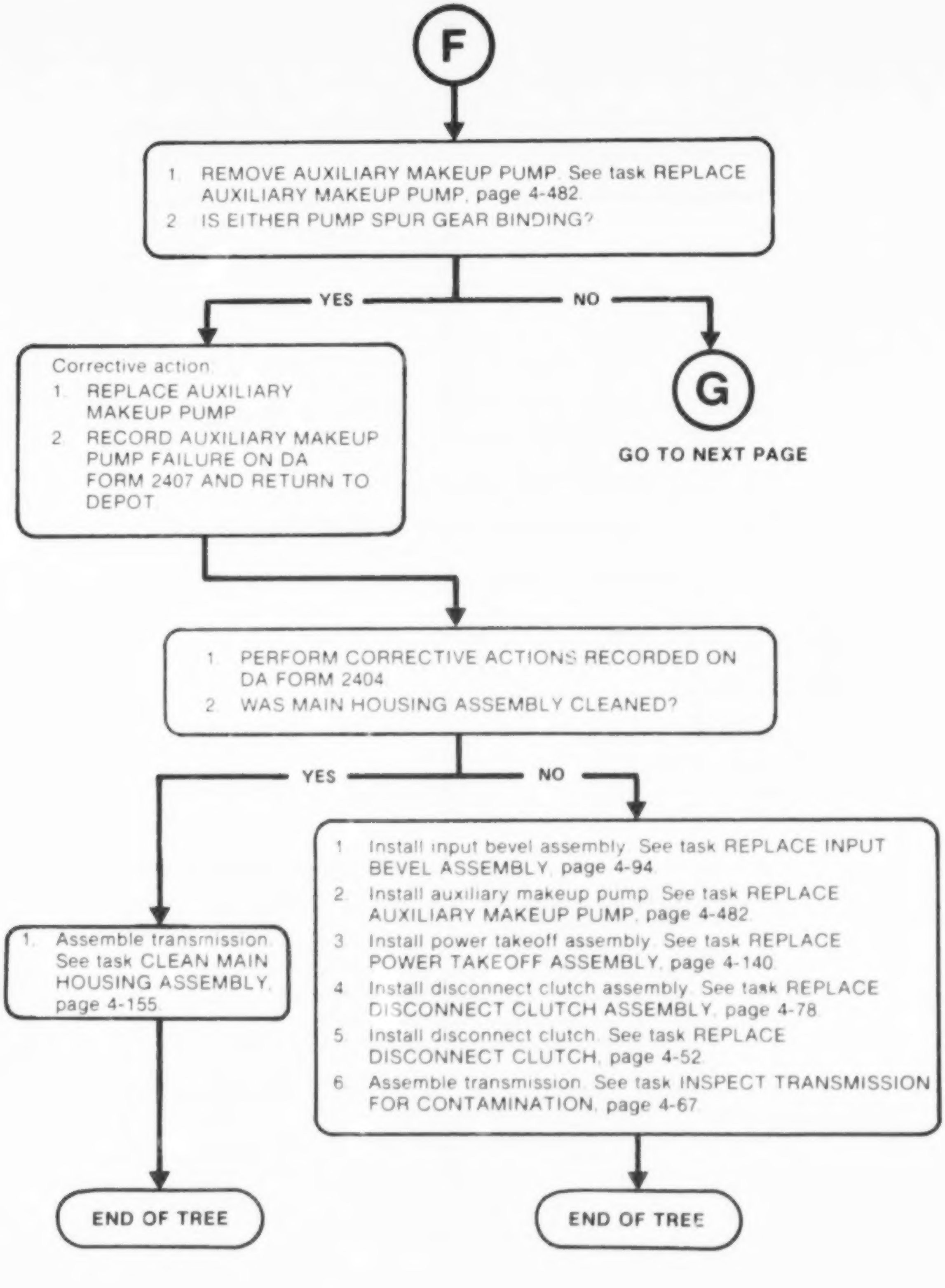

E
1. DID INSPECTION OF INPUT BEVEL GEAR OR INPUT IDLER SPUR GEAR REVEAL DAMAGE?
NO
F
GO TO NEXT PAGE
YES
1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?
YES
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.
END OF TREE
NO
1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
3. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
4. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
5. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
END OF TREE



1. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
2. IS EITHER PUMP SPUR GEAR BINDING?

YES:

Corrective action:

1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN TO DEPOT.

NO:

GO TO NEXT PAGE

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

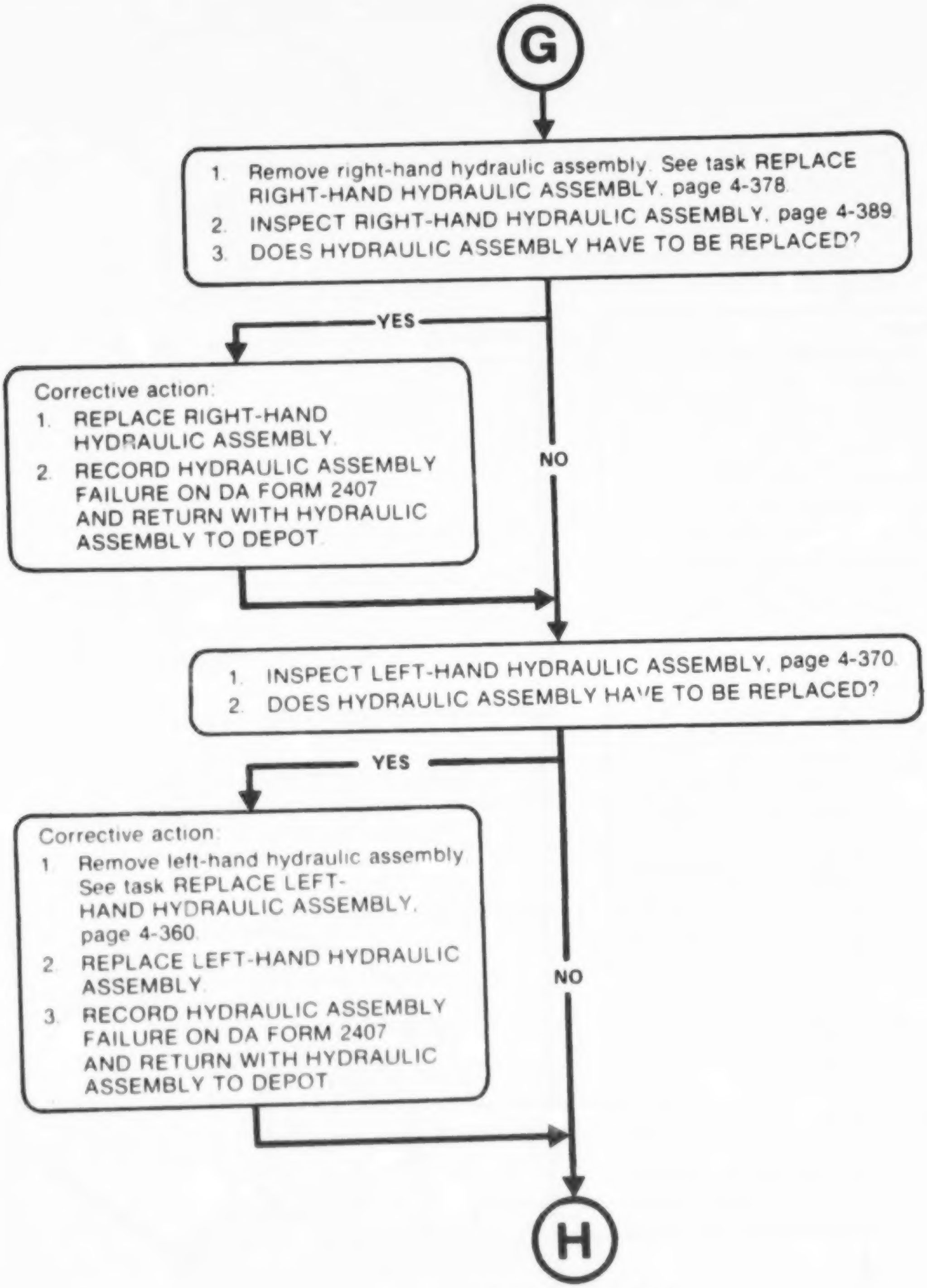
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
3. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
4. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
5. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
6. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. Remove left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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H

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

YES

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY. See page 2-2.
4. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
6. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY. See page 2-2.
7. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
8. CLEAN HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See page 2-2.

J

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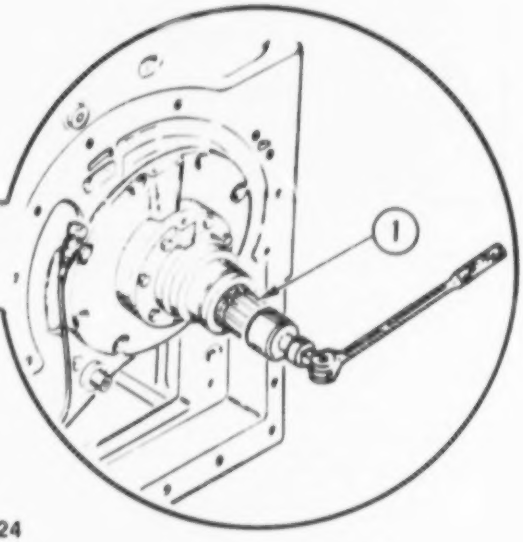
NO

1. USING DRAG WRENCH, ROTATE INPUT BEVEL SHAFT (1).
2. IS SHAFT (1) FROZEN OR BINDING?



YES

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NO

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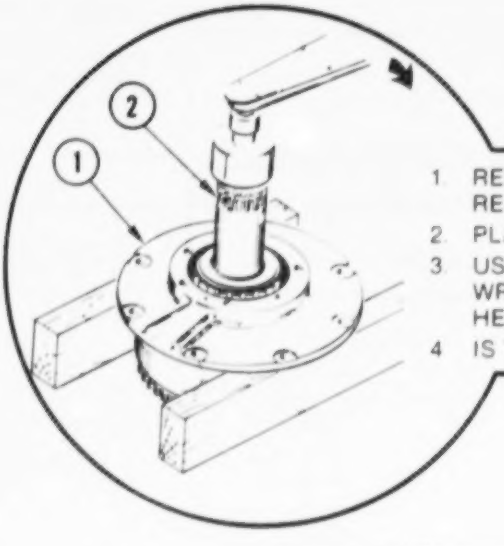


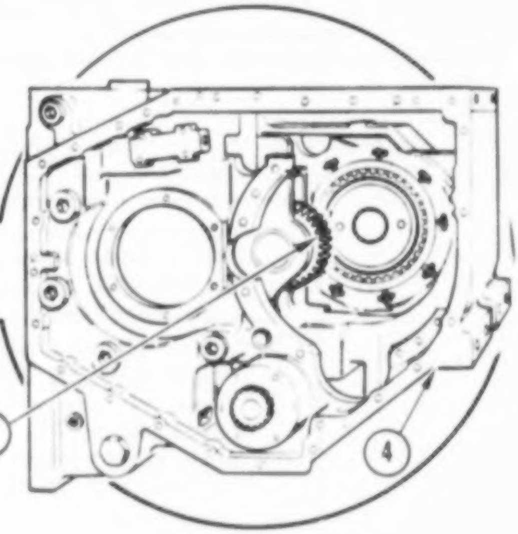
1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. PLACE INPUT BEVEL ASSEMBLY (1) ON WOOD BLOCKS.
3. USING TORQUE WRENCH WITH ADAPTER AND DRAG WRENCH, TURN SHAFT (2) ONE FULL TURN. HAVE HELPER ASSIST.
4. IS TURNING TORQUE MORE THAN 20 IN-LB (17-23 CMKG)?

YES

Corrective action:
1. REPAIR INPUT BEVEL ASSEMBLY. See page 4-126.

NO

1. INSPECT INPUT IDLER GEAR (3) IN HOUSING (4) FOR DAMAGE. See page 2-5.
2. IS IDLER GEAR DAMAGED?



YES

Corrective action:
1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

NO

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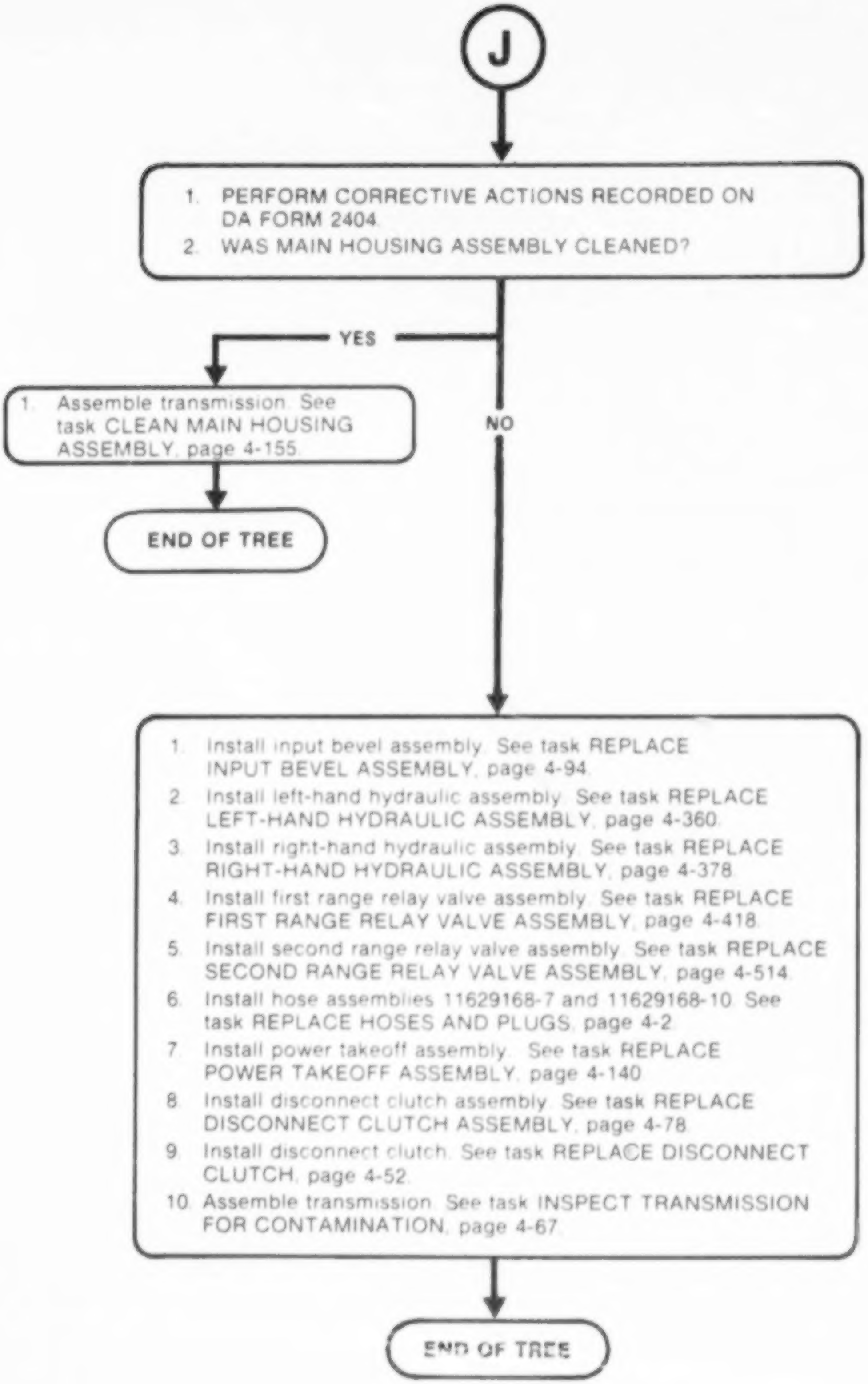


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
3. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
4. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
5. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
6. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
7. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
8. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
9. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

SERVICE BRAKE FAILURE

DESCRIPTION

This tree covers inspection for a fault causing service brake failure and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive – (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

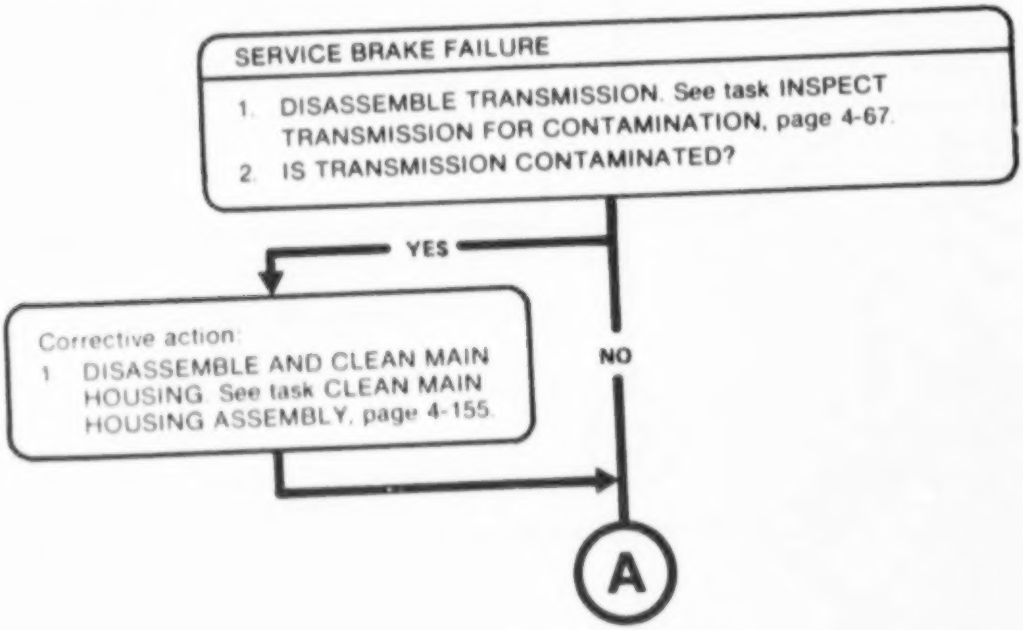
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



SERVICE BRAKE FAILURE

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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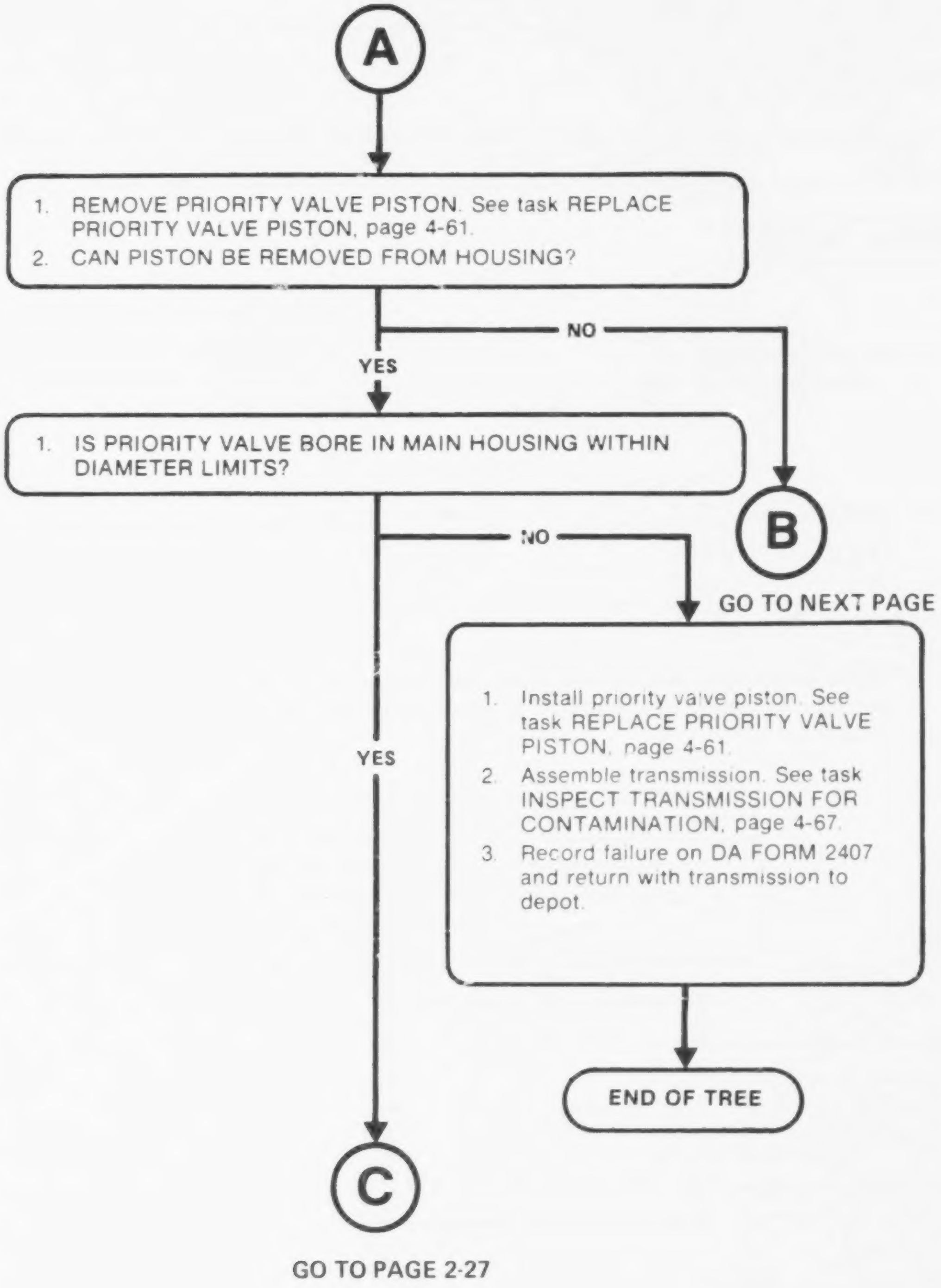


1. REMOVE PRIORITY VALVE PISTON. See task REPLACE PRIORITY VALVE PISTON, page 4-61.
2. CAN PISTON BE REMOVED FROM HOUSING?

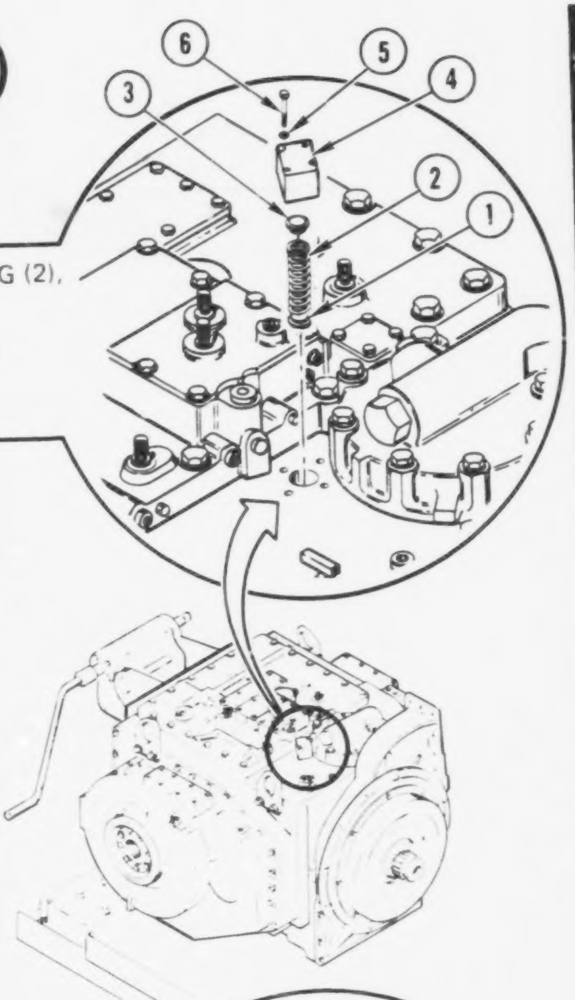
1. IS PRIORITY VALVE BORE IN MAIN HOUSING WITHIN DIAMETER LIMITS?

1. Install priority valve piston. See task REPLACE PRIORITY VALVE PISTON, page 4-61.
2. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
3. Record failure on DA FORM 2407 and return with transmission to depot.

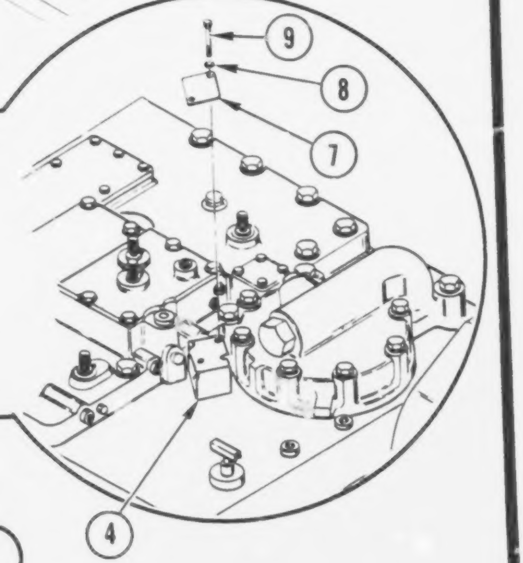
A
NO
YES
B
GO TO NEXT PAGE
NO
YES
END OF TREE
C
GO TO PAGE 2-27

B

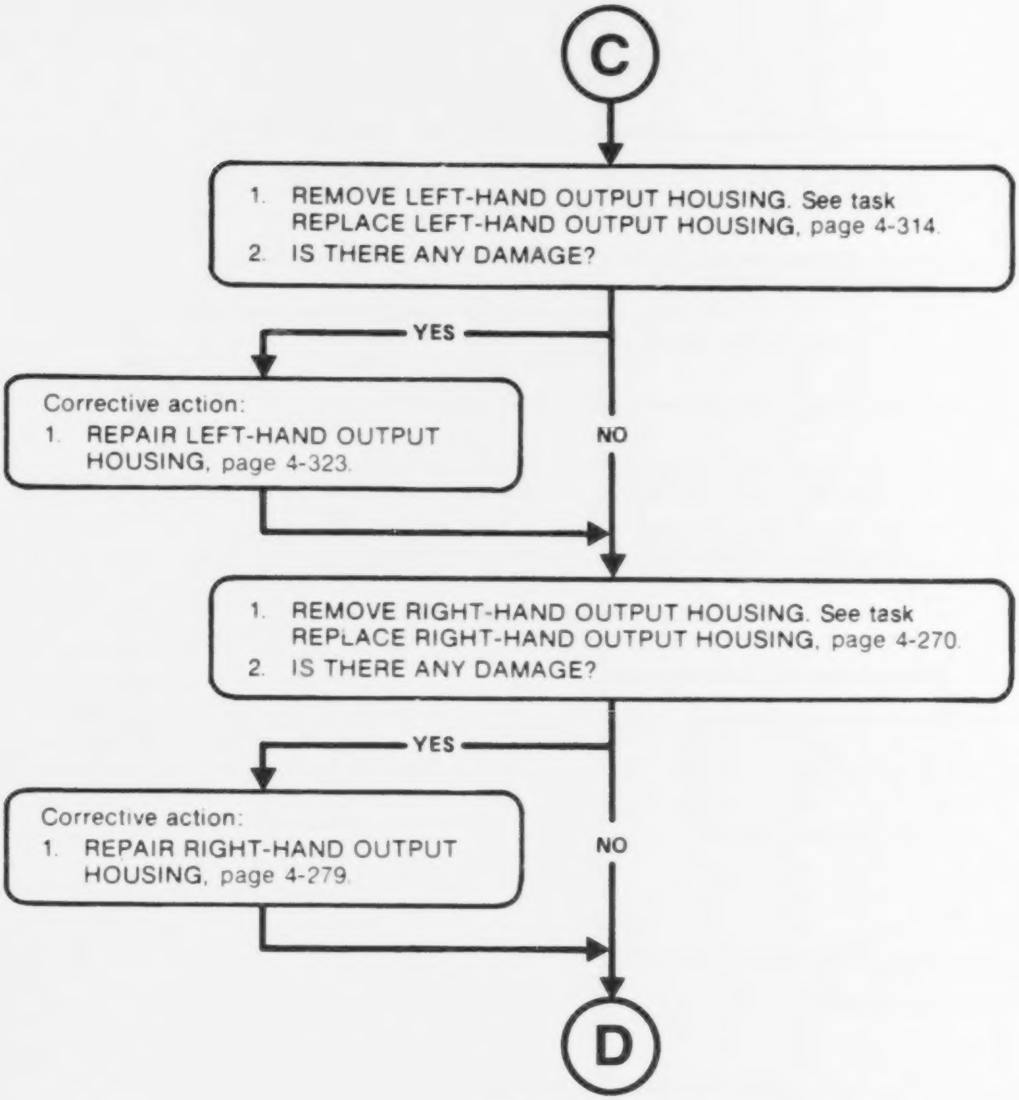
1. INSTALL BOTTOM HELICAL SEAT (1), SPRING (2), AND TOP HELICAL SEAT (3).
2. INSTALL PRIORITY VALVE COVER (4) WITH TWO WASHERS (5) AND TWO LONG SCREWS (6). HAND TIGHTEN SCREWS.



1. POSITION COVER (7) OVER PRIORITY COVER (4) AND INSTALL TWO WASHERS (8) AND SCREWS (9). HAND TIGHTEN SCREWS.
2. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAIMINATION, page 4-67.
3. Record failure on DA FORM 2407 and return with transmission to depot.



END OF TREE



1. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
2. IS THERE ANY DAMAGE?

Corrective action:
1. REPAIR LEFT-HAND OUTPUT HOUSING, page 4-323.

1. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
2. IS THERE ANY DAMAGE?

Corrective action:
1. REPAIR RIGHT-HAND OUTPUT HOUSING, page 4-279.

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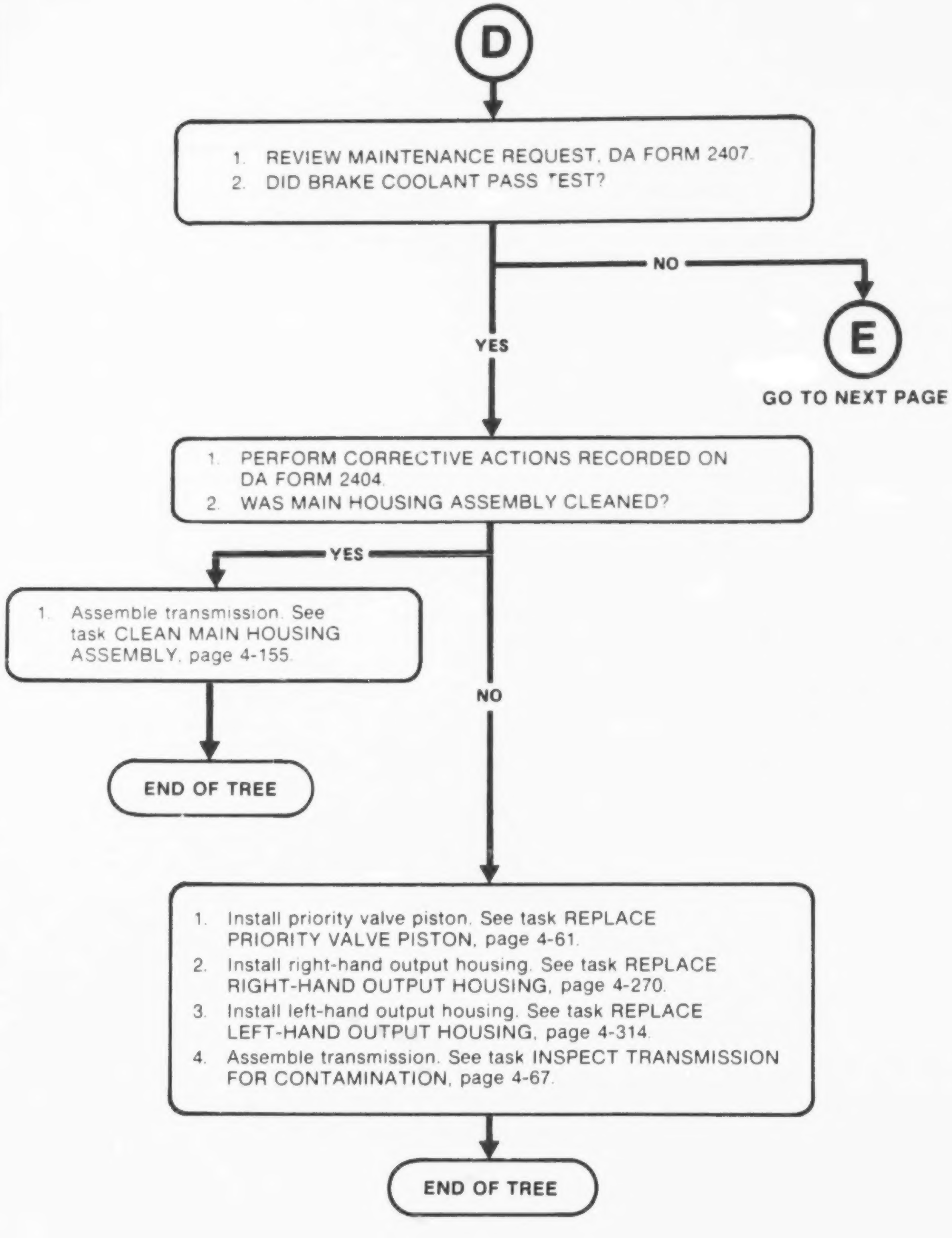
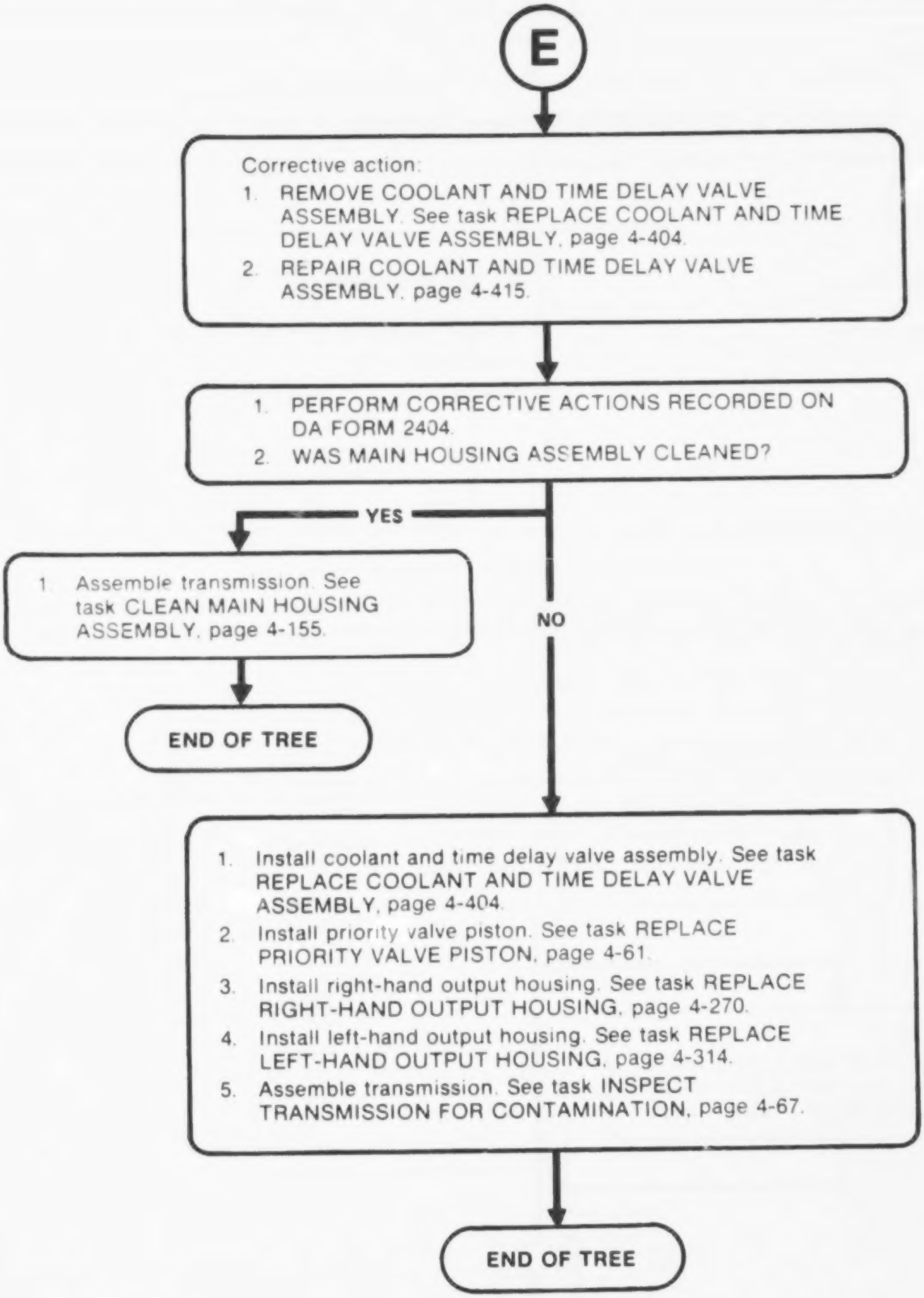


1. REVIEW MAINTENANCE REQUEST, DA FORM 2407.
2. DID BRAKE COOLANT PASS TEST?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install priority valve piston. See task REPLACE PRIORITY VALVE PISTON, page 4-61.
2. Install right-hand output housing. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
3. Install left-hand output housing. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
4. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



Corrective action:

1. REMOVE COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
2. REPAIR COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-415.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
2. Install priority valve piston. See task REPLACE PRIORITY VALVE PISTON, page 4-61.
3. Install right-hand output housing. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. Install left-hand output housing. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
5. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

TRANSMISSION CREEP

DESCRIPTION

This tree covers inspection for a fault causing transmission creep and for making repairs when the fault is found.

INITIAL SETUP

Personnel Required:

Track Veh Rep 63H10

References:

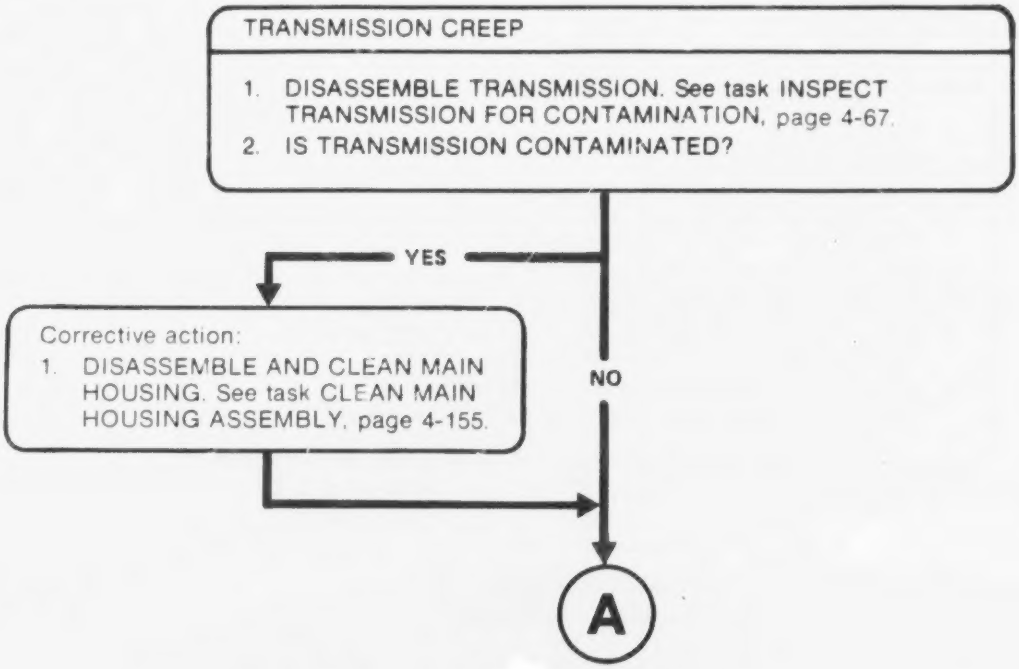
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



TRANSMISSION CREEP

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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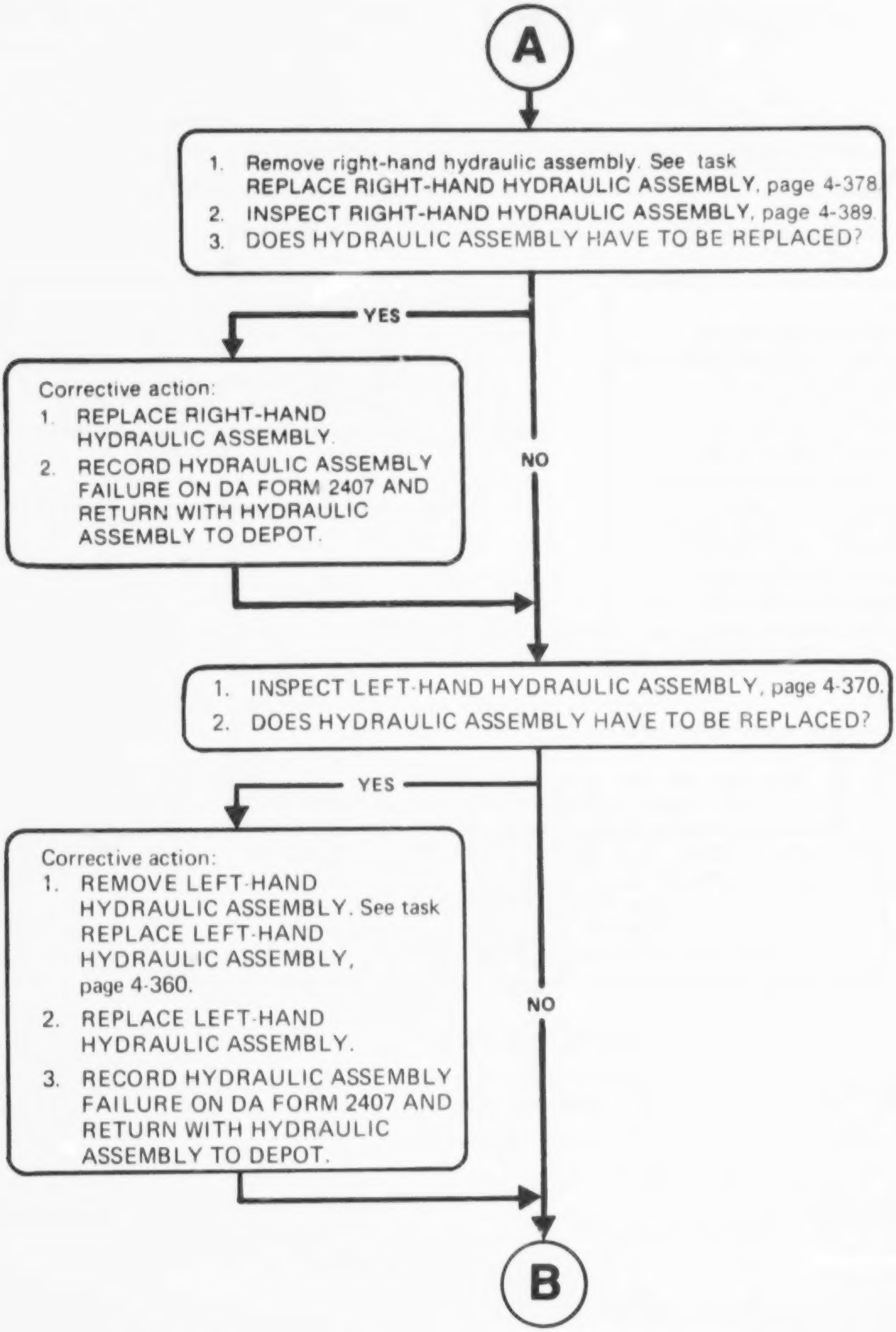

1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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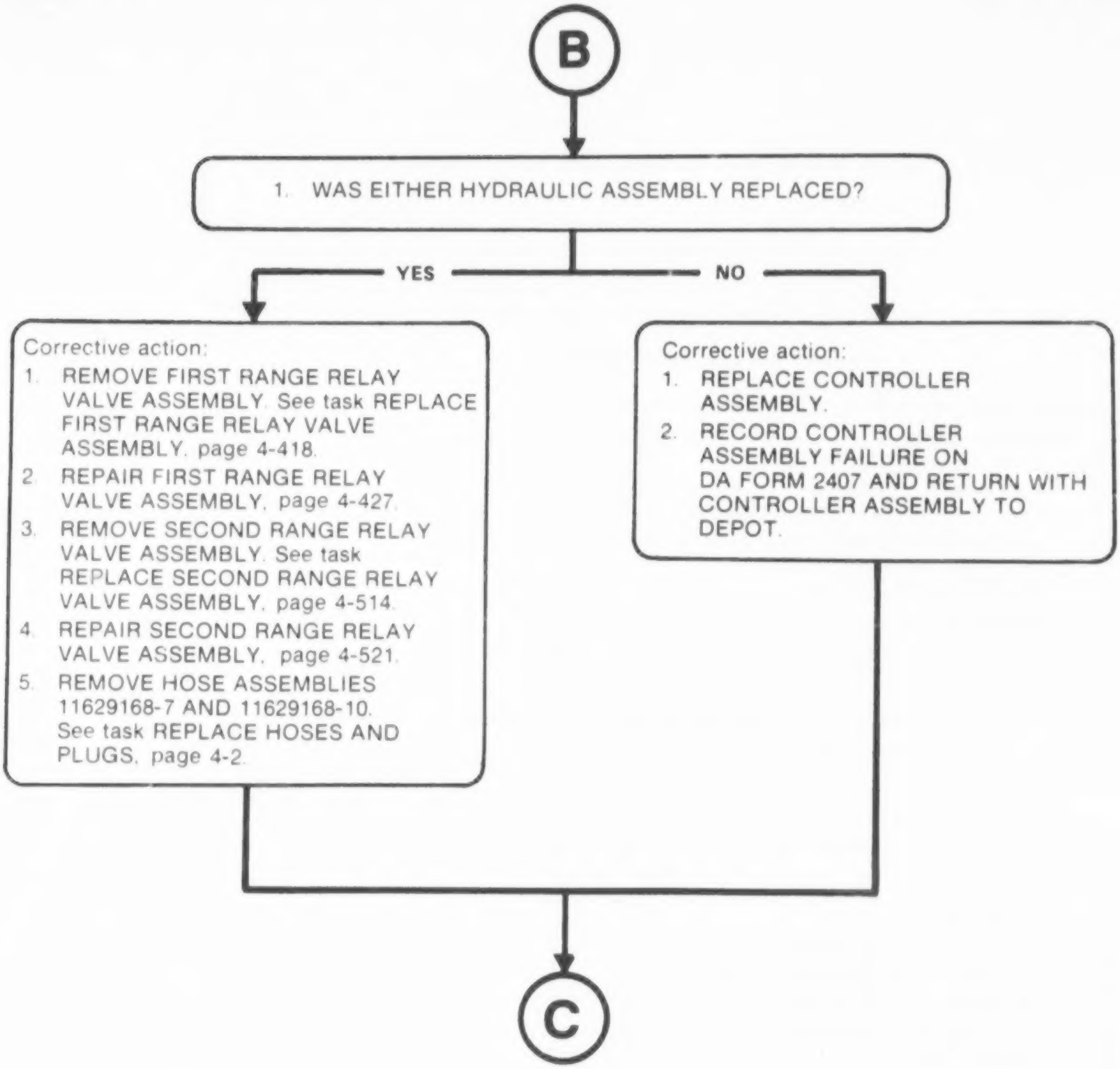

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER ASSEMBLY TO DEPOT.

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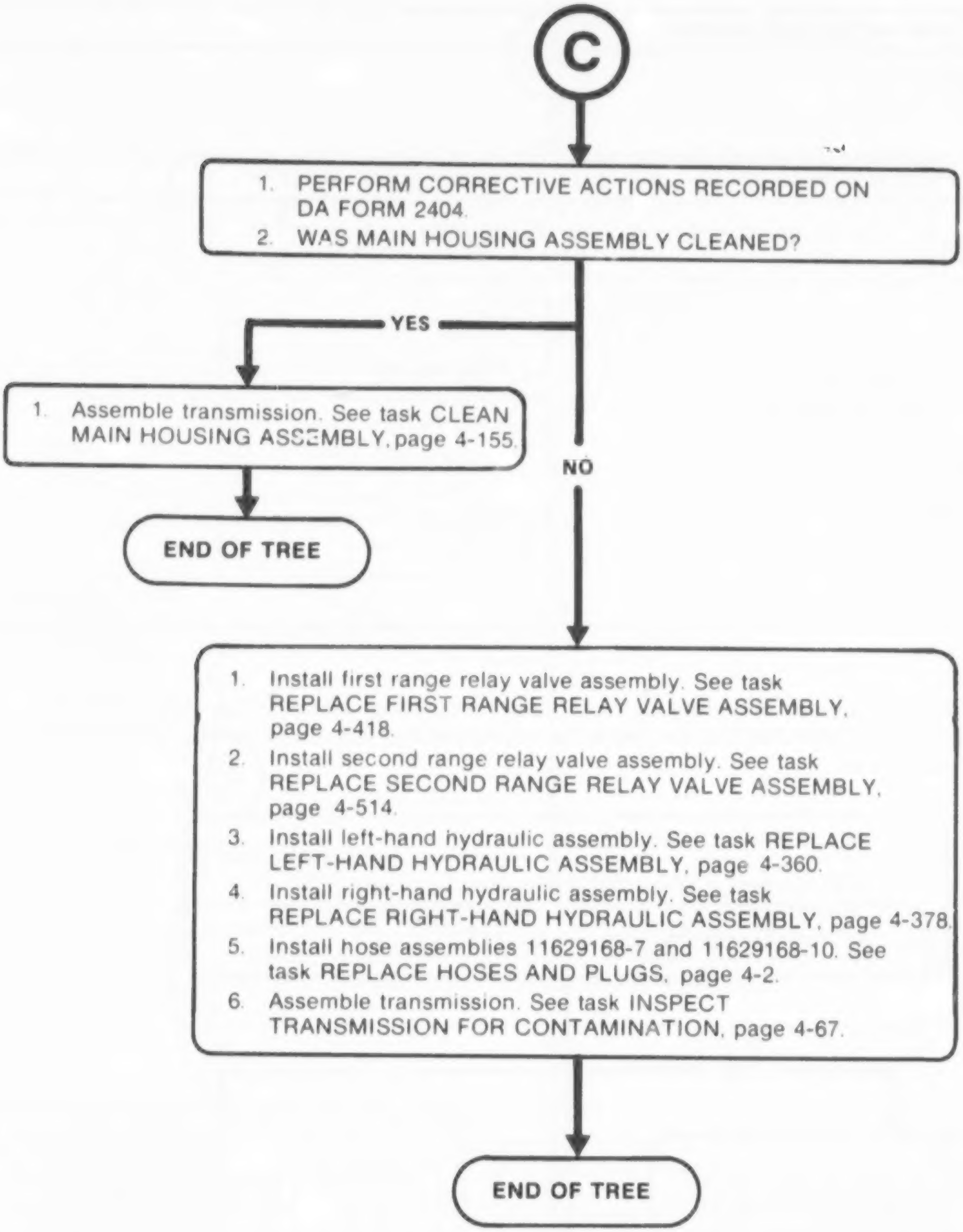


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
3. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
4. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

NO ACCELERATION IN SECOND RANGE

DESCRIPTION

This tree covers inspection for a fault causing poor vehicle performance in second range and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

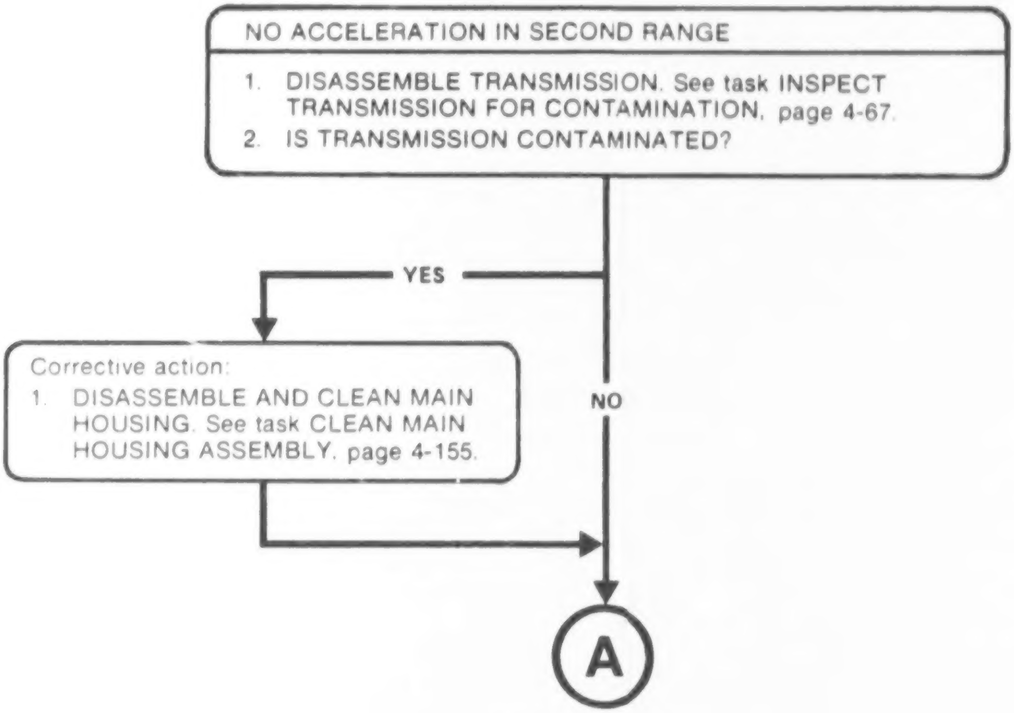
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



NO ACCELERATION IN SECOND RANGE

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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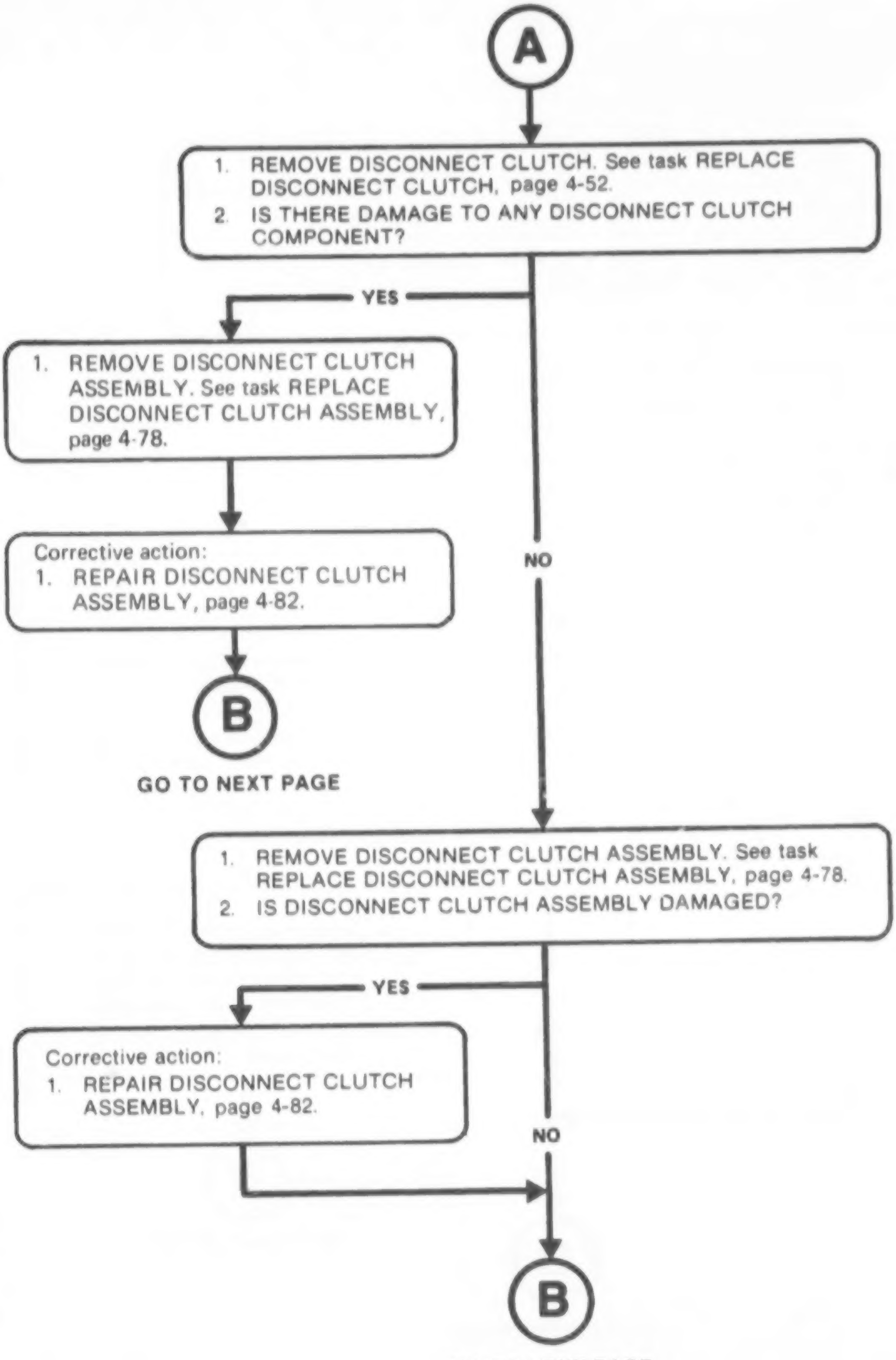

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. IS THERE DAMAGE TO ANY DISCONNECT CLUTCH COMPONENT?

YES:

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

GO TO NEXT PAGE

NO:

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. IS DISCONNECT CLUTCH ASSEMBLY DAMAGED?

YES:

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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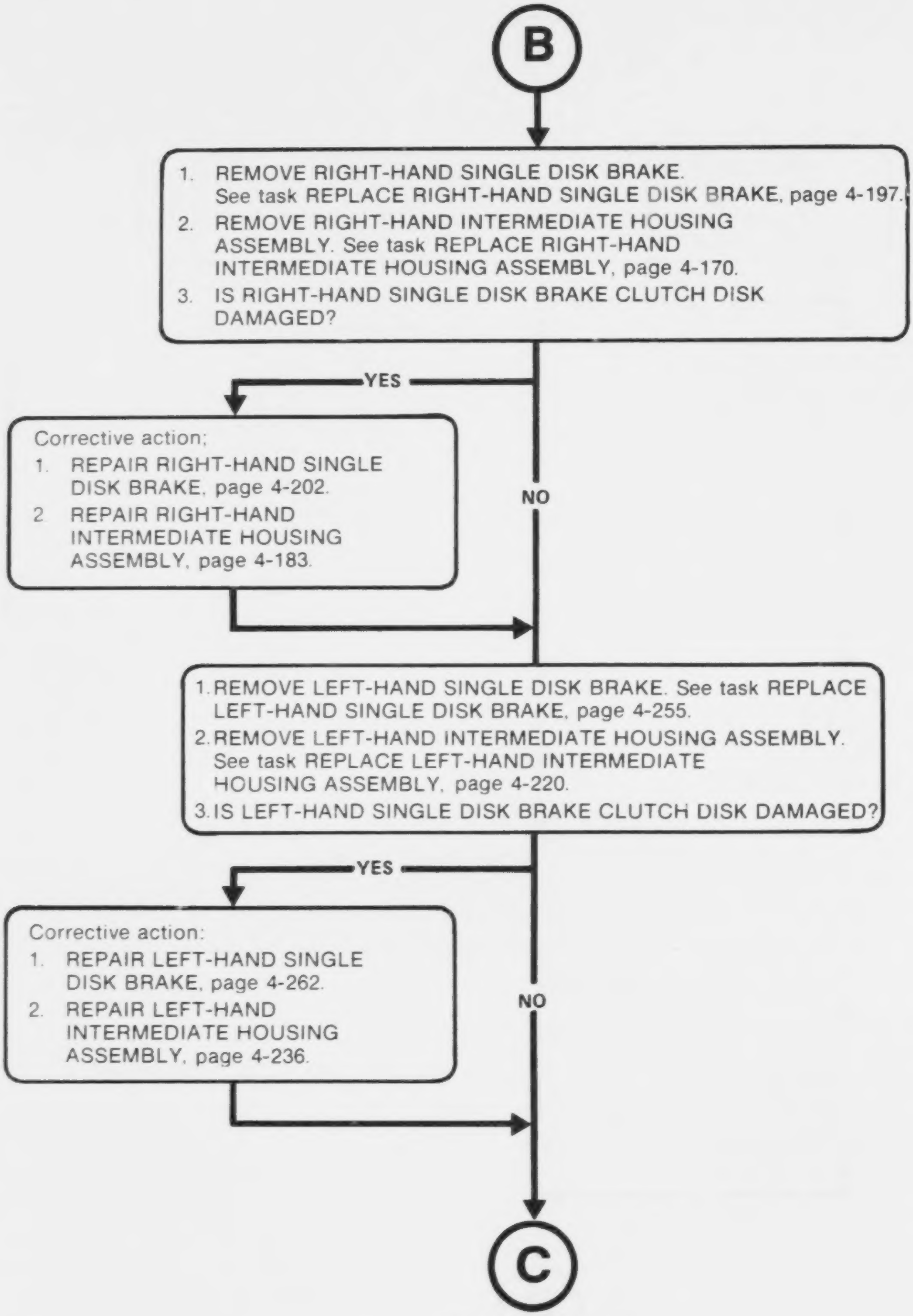

1. REMOVE RIGHT-HAND SINGLE DISK BRAKE. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
2. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
3. IS RIGHT-HAND SINGLE DISK BRAKE CLUTCH DISK DAMAGED?

Corrective action:

1. REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-202.
2. REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-183.

1. REMOVE LEFT-HAND SINGLE DISK BRAKE. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
2. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
3. IS LEFT-HAND SINGLE DISK BRAKE CLUTCH DISK DAMAGED?

Corrective action:

1. REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.
2. REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-236.

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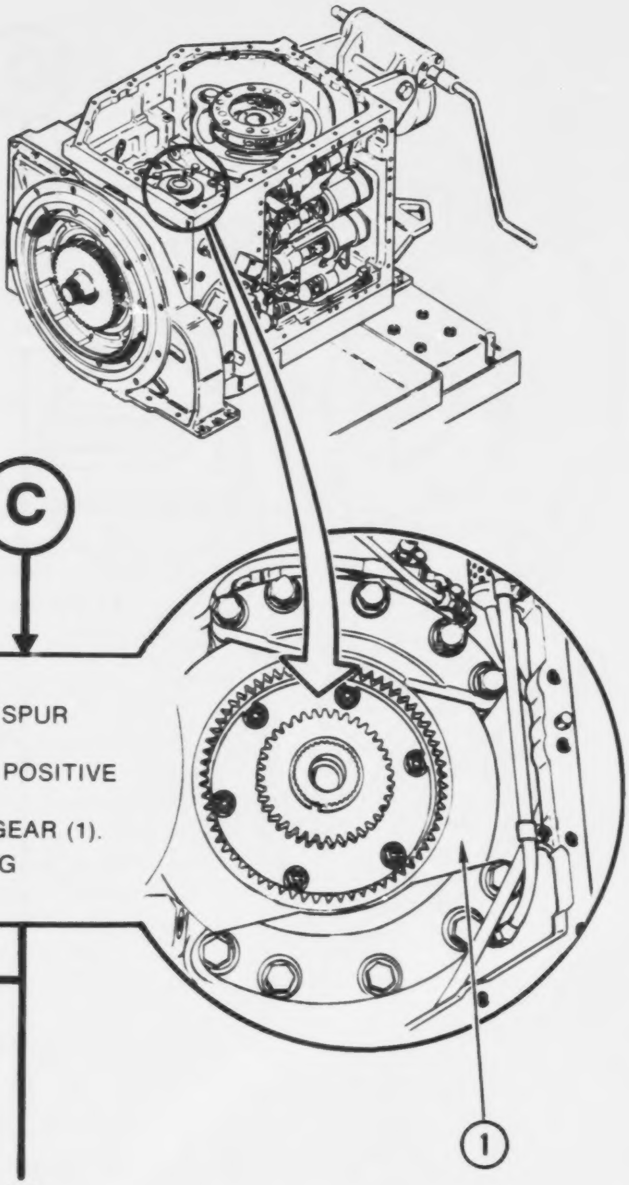

C

1. Remove spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
2. Remove positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
3. INSPECT SECOND RANGE BRAKE RING GEAR (1).
4. IS RING GEAR (1) SCORED OR DOES RING GEAR HAVE SURFACE CRACKS?

YES

Corrective action:

1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

E

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NO

D

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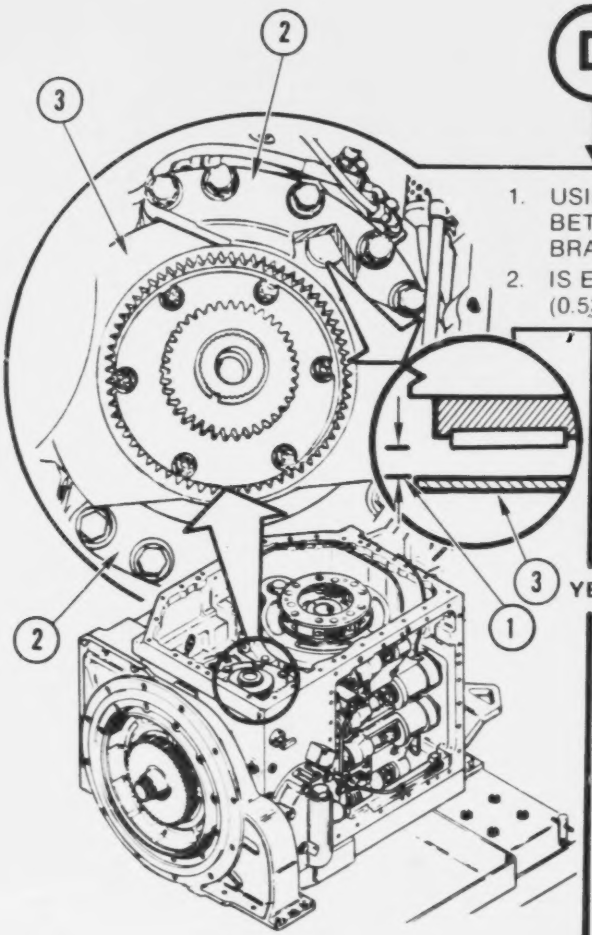

D

1. USING FEELER GAGE, CHECK CLEARANCE (1) BETWEEN TWO PADS ON EACH SECOND RANGE BRAKE (2) AND RING GEAR (3).
2. IS EACH CLEARANCE (1) 0.021-0.060 INCH (0.53-1.52 mm)?

NO

Corrective action:
1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

YES

E

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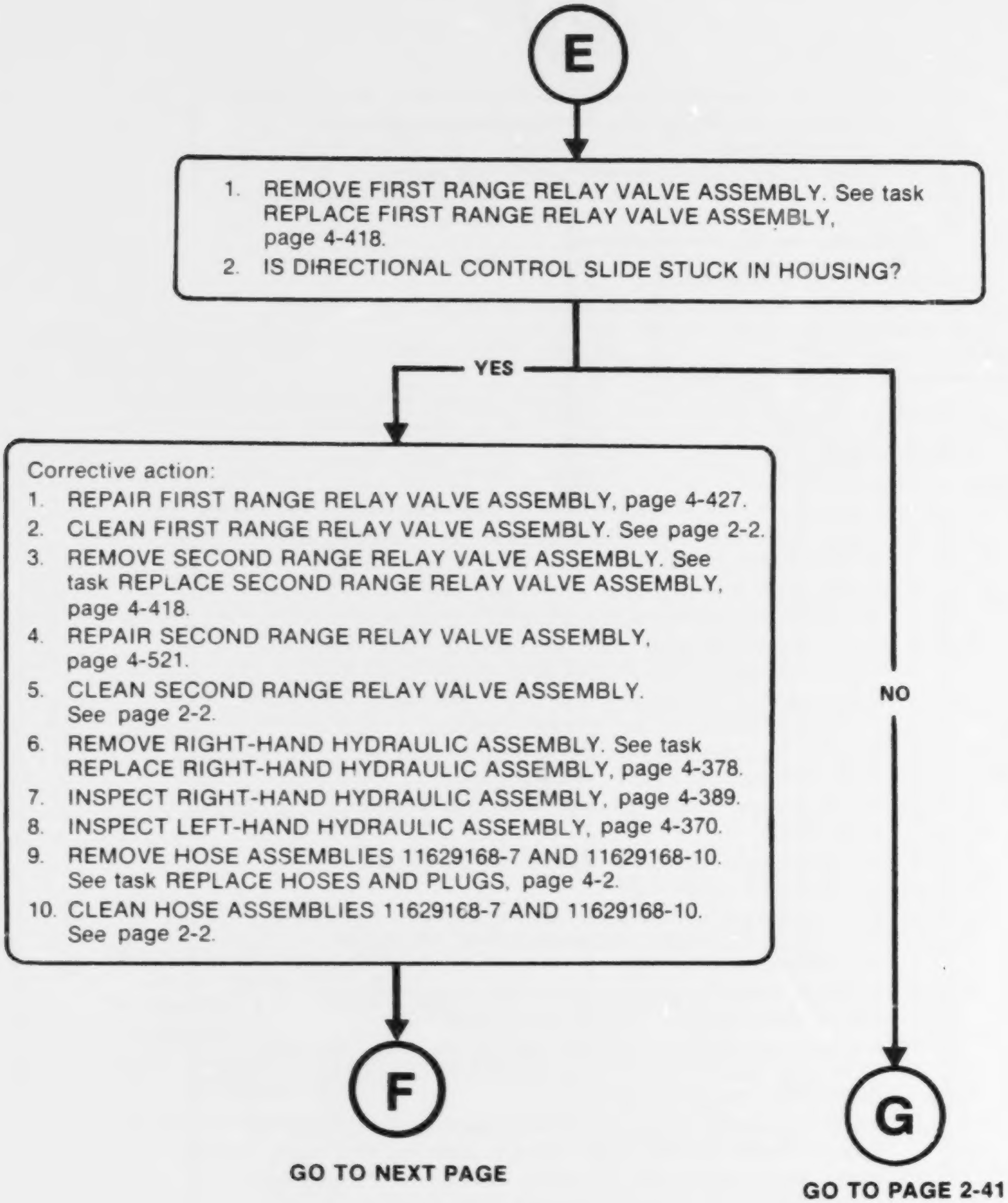

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
2. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY. See page 2-2.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY. See page 2-2.
6. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
7. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
8. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
9. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
10. CLEAN HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See page 2-2.

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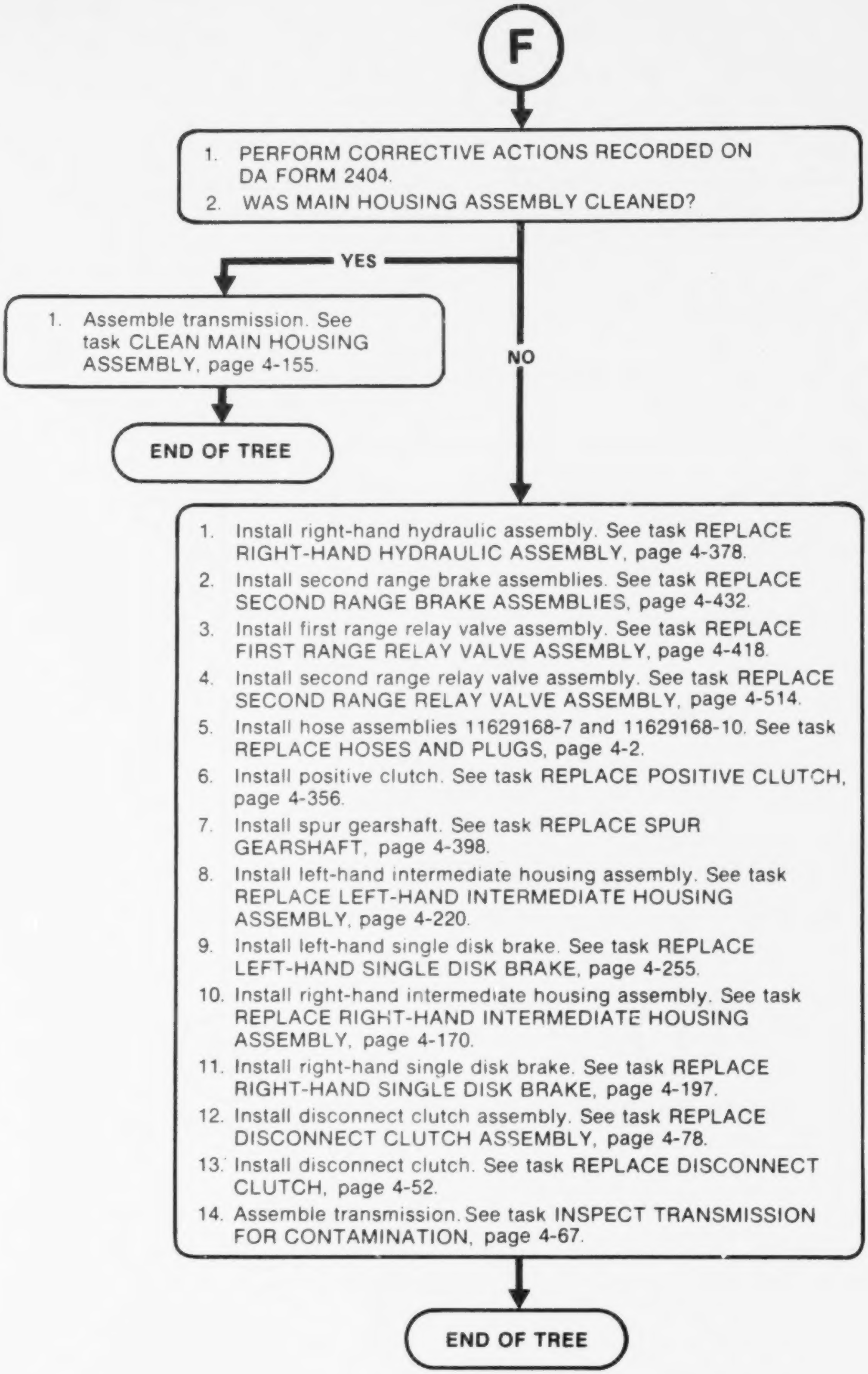


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

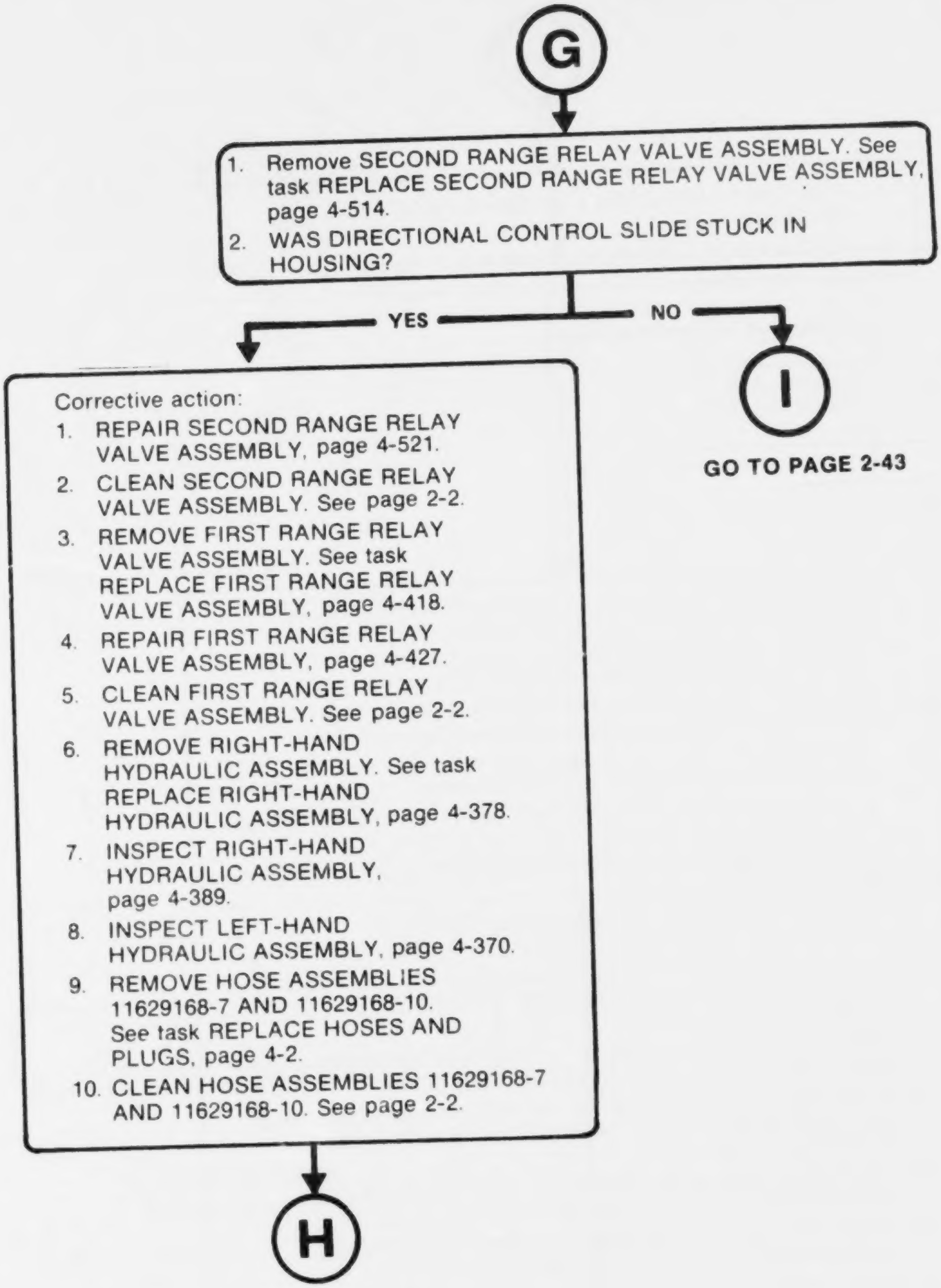
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
9. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
10. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
11. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
12. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
13. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
14. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. Remove SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
2. WAS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
2. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY. See page 2-2.
3. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
5. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY. See page 2-2.
6. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
7. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
8. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
9. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
10. CLEAN HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See page 2-2.

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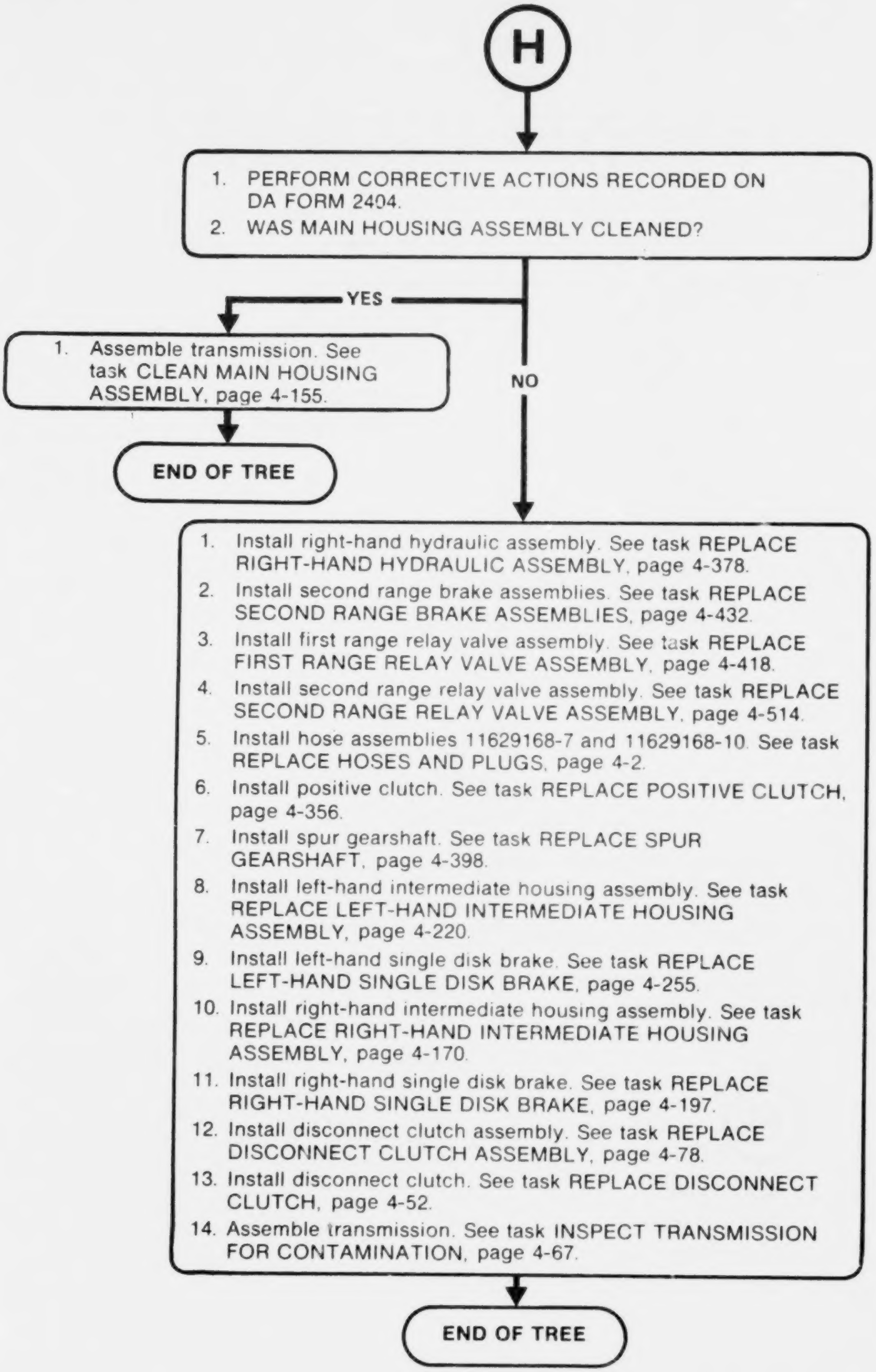


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

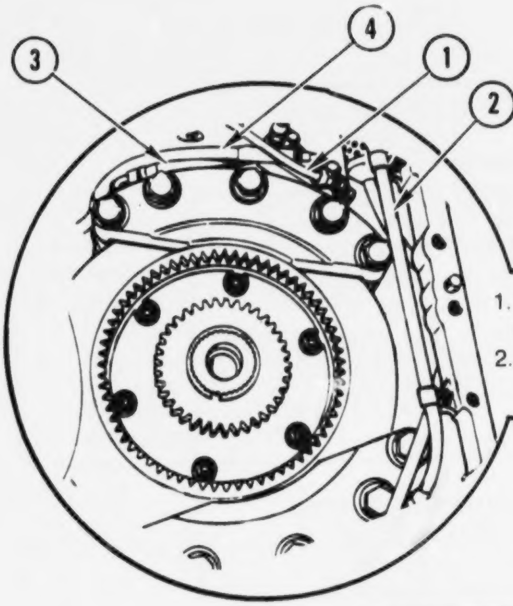
END OF TREE

NO

1. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
9. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
10. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
11. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
12. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
13. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
14. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

I



1. INSPECT HOSE ASSEMBLIES 11628453-3 (1), 11629168-5 (2), AND 11629168-6 (3), AND 11629168-9 (4). See page 2-5.
2. ARE THERE ANY DAMAGED HOSES, HOSE TO BOSS ELBOWS, OR ADAPTERS?

NO

K

GO TO PAGE 2-45

YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLIES, ELBOWS, OR ADAPTERS. See task REPLACE HOSES AND PLUGS, page 4-2.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO

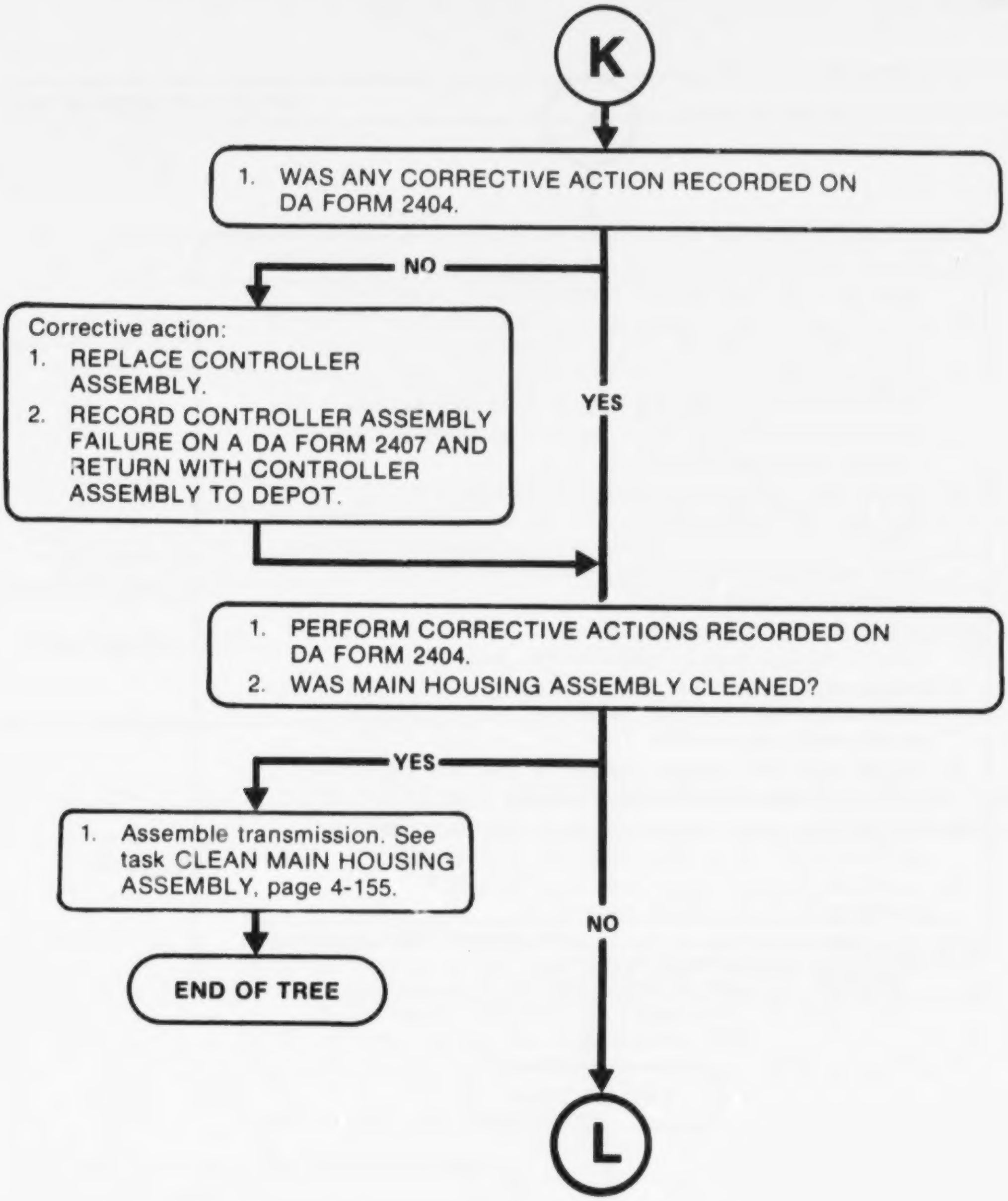
J

GO TO NEXT PAGE

J

1. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
3. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
5. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
6. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
7. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
8. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
10. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
11. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. WAS ANY CORRECTIVE ACTION RECORDED ON DA FORM 2404.

Corrective action:
1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON A DA FORM 2407 AND RETURN WITH CONTROLLER ASSEMBLY TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

GO TO NEXT PAGE

L

1. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
3. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
5. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
6. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
7. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
8. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
10. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
11. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

LOW MAKEUP PRESSURE

DESCRIPTION

This tree covers inspection for a fault causing low makeup pressure and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive – (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

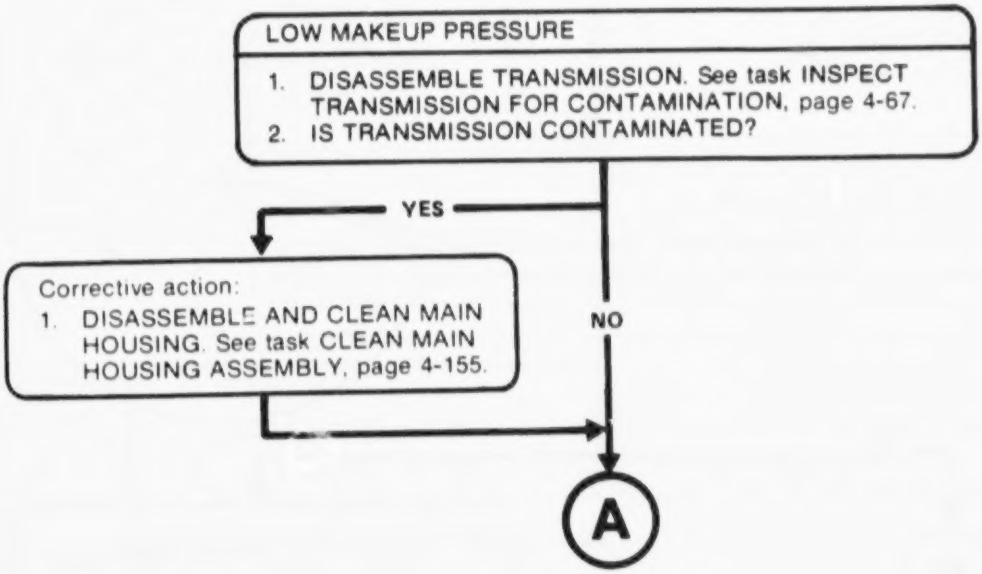
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



LOW MAKEUP PRESSURE

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

GO TO NEXT PAGE

A

1. REMOVE MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
2. IS CONTROL VALVE PISTON STUCK IN MAIN HOUSING?

YES

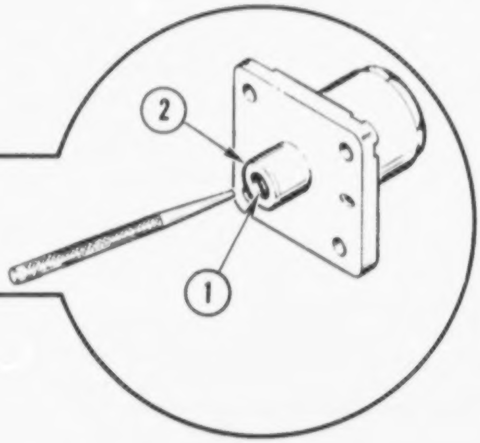
Corrective action:

1. INSTALL MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
2. ASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
3. RECORD MAKEUP PUMP FLUID REGULATING VALVE FAILURE ON DA FORM 2407 AND RETURN WITH TRANSMISSION TO DEPOT.

END OF TREE

NO

1. USING PIN PUNCH, PUSH PILOT VALVE PISTON (1) INTO HOUSING (2) AND RELEASE.
2. DID PISTON (1) RETURN TO ORIGINAL POSITION?



YES

B

GO TO NEXT PAGE

NO

Corrective action:

1. REPAIR MAKE UP PUMP FLUID REGULATING VALVE, page 3-30.

END OF TREE

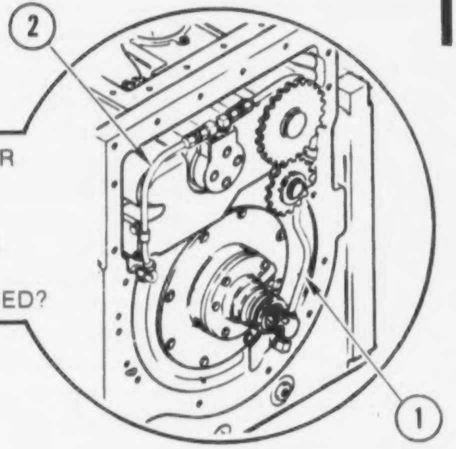
B

1. REMOVE COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT TIME DELAY VALVE ASSEMBLY, page 4-404.
2. DID VALVE COMPONENTS FAIL INSPECTION?

YES

Corrective action:
1. REPAIR COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-408.

NO



1. Remove power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. INSPECT HOSE ASSEMBLIES 11627588-14 (1) AND 11628453-6 (2), HOSE TO BOSS ELBOWS, AND ADAPTER. See page 2-5.
3. IS ANY HOSE ASSEMBLY, ELBOW, OR ADAPTER DAMAGED?

YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY, ELBOW, OR ADAPTER. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
2. IS AUXILIARY PUMP SHOULDERED SHAFT DAMAGED?

YES

NO

1. IS MAKEUP PUMP SHOULDERED SHAFT DAMAGED?

YES

NO

C

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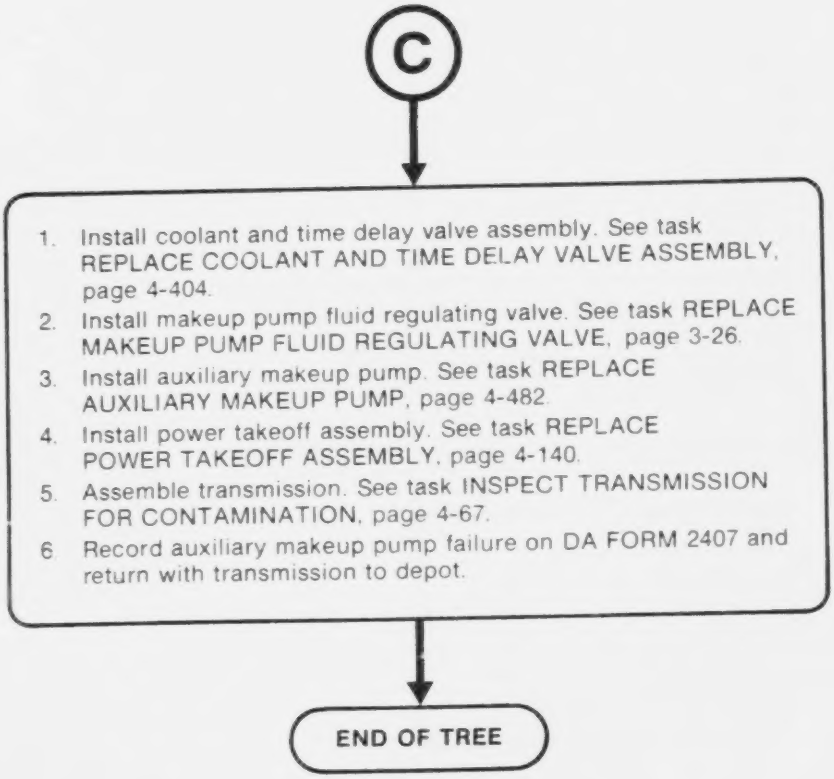
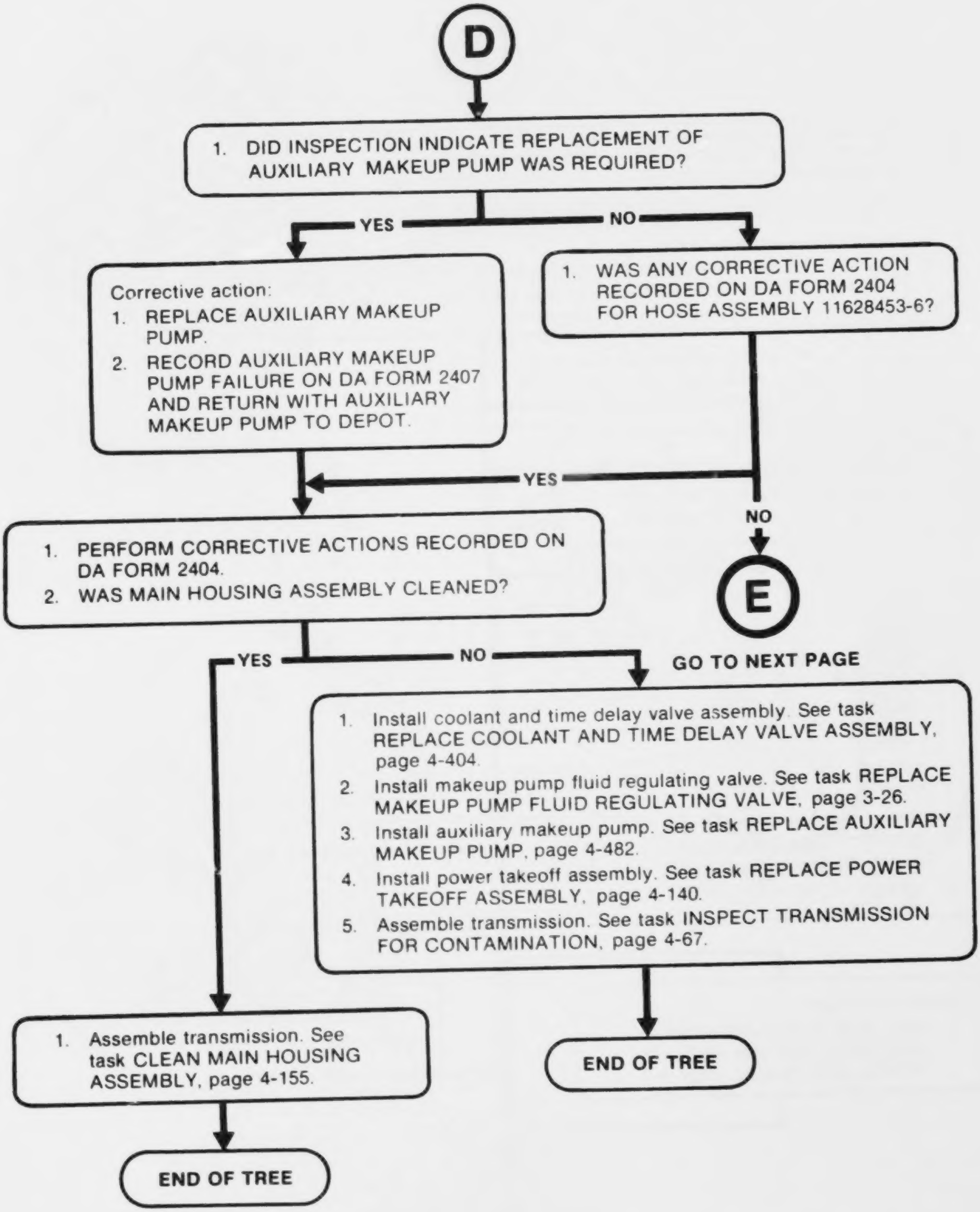
D

GO TO PAGE 2-51



1. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
2. Install makeup pump fluid regulating valve. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
3. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
4. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
5. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
6. Record auxiliary makeup pump failure on DA FORM 2407 and return with transmission to depot.



1. DID INSPECTION INDICATE REPLACEMENT OF AUXILIARY MAKEUP PUMP WAS REQUIRED?

Corrective action:
1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN WITH AUXILIARY MAKEUP PUMP TO DEPOT.

1. WAS ANY CORRECTIVE ACTION RECORDED ON DA FORM 2404 FOR HOSE ASSEMBLY 11628453-6?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

GO TO NEXT PAGE

1. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
2. Install makeup pump fluid regulating valve. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
3. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
4. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
5. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

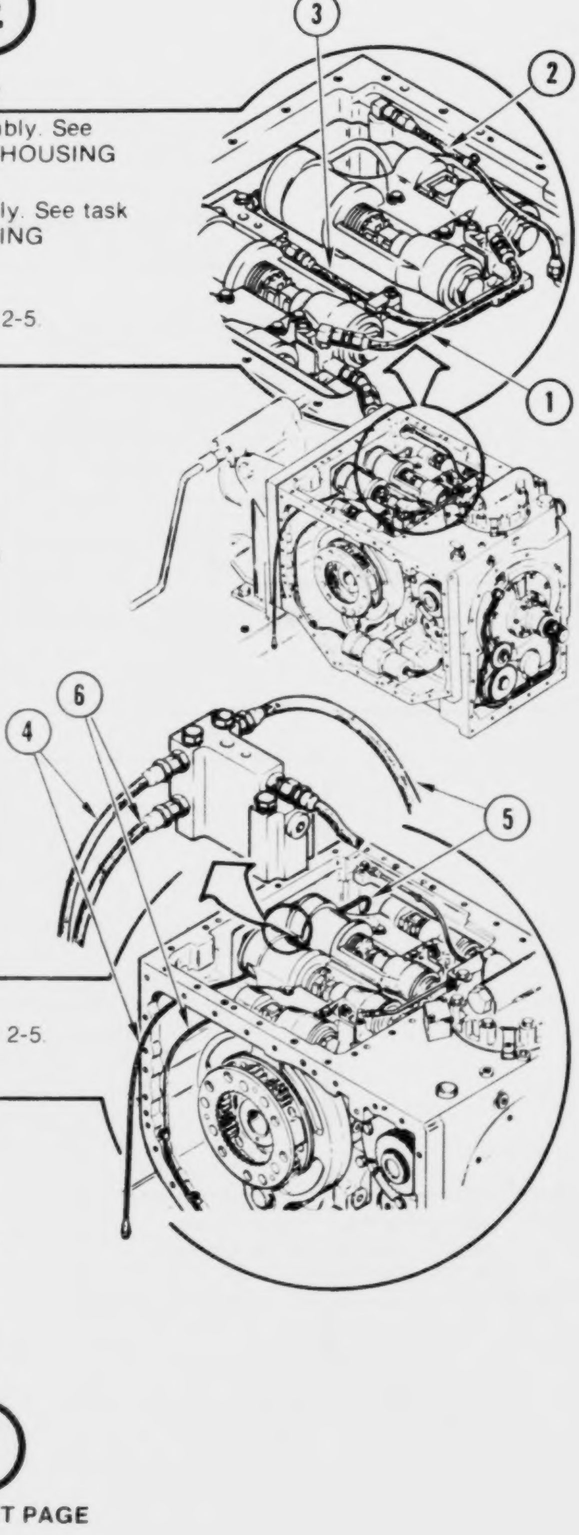
END OF TREE

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

E

1. Remove right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. Remove left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
3. INSPECT HOSE ASSEMBLIES 11629168-2 (1), 11628453-7 (2), AND 11629168-7 (3). See page 2-5.
4. IS ANY HOSE ASSEMBLY DAMAGED?



YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. INSPECT HOSE ASSEMBLIES 11629168-1 (4), 11629168-3 (5), AND 11629168-10 (6). See page 2-5.
2. IS ANY HOSE ASSEMBLY DAMAGED?

YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

F

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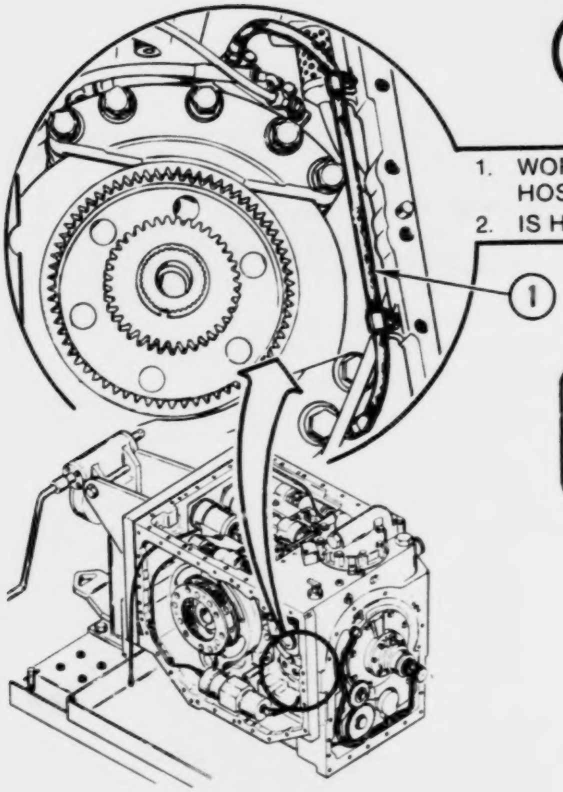
(F)

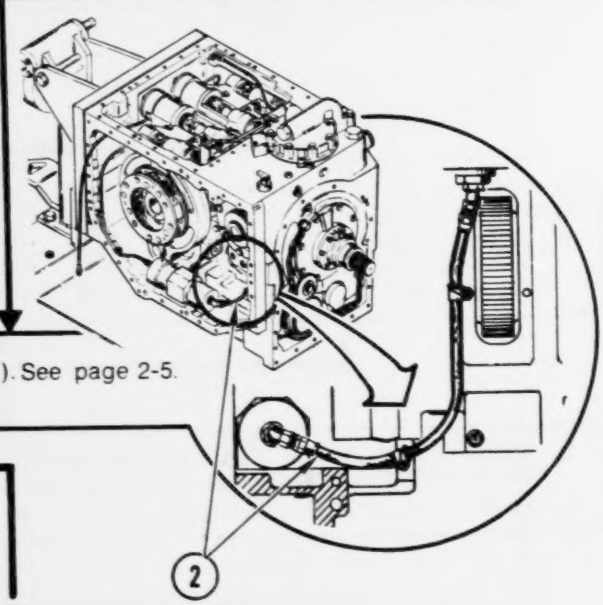


1. WORKING ON LEFT SIDE OF TRANSMISSION, INSPECT HOSE ASSEMBLY 11629168-5 (1). See page 2-5.
2. IS HOSE ASSEMBLY DAMAGED?

YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO



1. INSPECT HOSE ASSEMBLY 11627588-11 (2). See page 2-5.
2. IS HOSE ASSEMBLY DAMAGED?

YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

(G)

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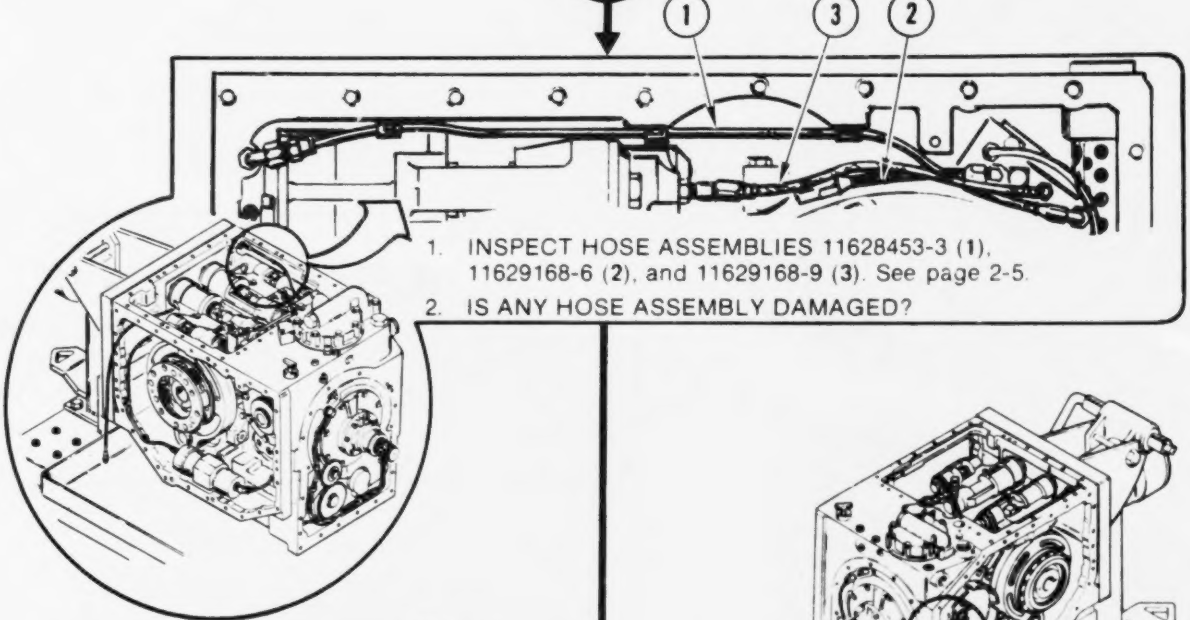
G



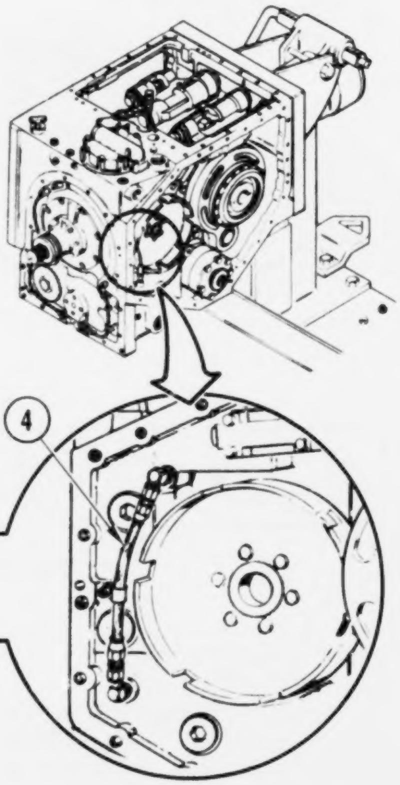
1. INSPECT HOSE ASSEMBLIES 11628453-3 (**1**), 11629168-6 (**2**), and 11629168-9 (**3**). See page 2-5.
2. IS ANY HOSE ASSEMBLY DAMAGED?

YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO



1. WORKING ON RIGHT SIDE OF TRANSMISSION, INSPECT HOSE ASSEMBLY 11627588-15 (4). See page 2-5.
2. IS HOSE ASSEMBLY DAMAGED ?

YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLY. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

H

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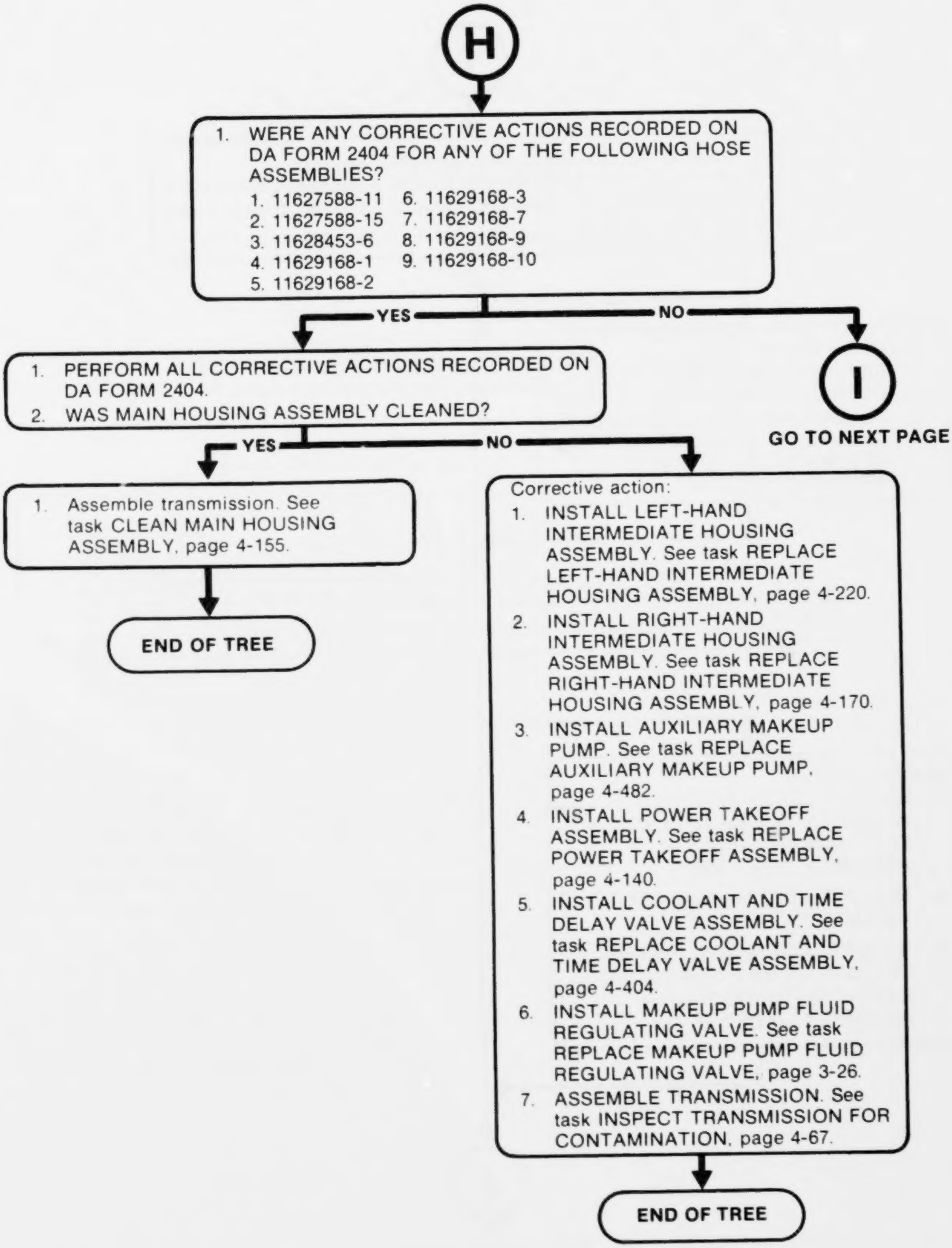


1. WERE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404 FOR ANY OF THE FOLLOWING HOSE ASSEMBLIES?
   1. 11627588-11
   2. 11627588-15
   3. 11628453-6
   4. 11629168-1
   5. 11629168-2
   6. 11629168-3
   7. 11629168-7
   8. 11629168-9
   9. 11629168-10

YES:

1. PERFORM ALL CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

GO TO NEXT PAGE

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

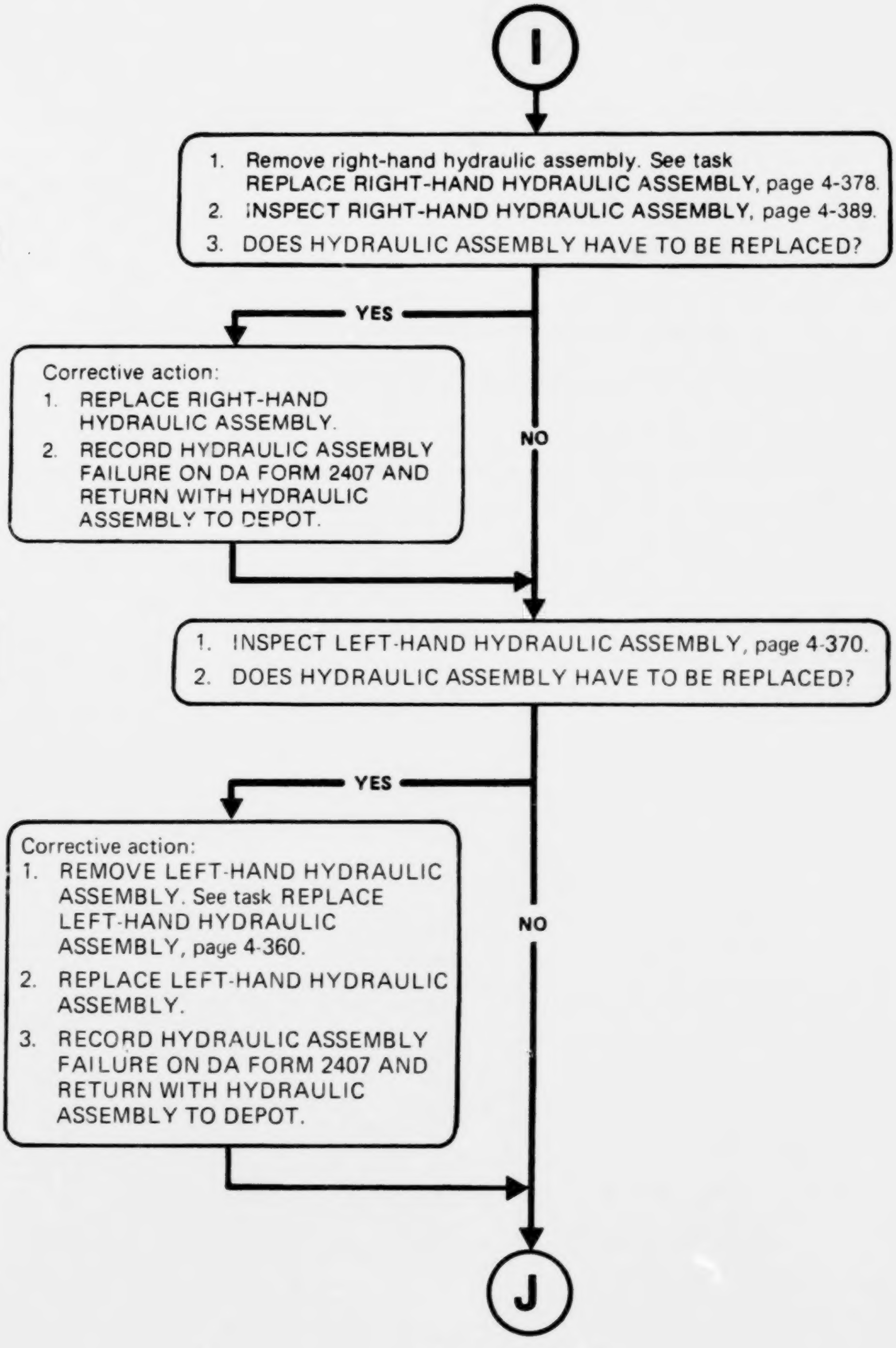
END OF TREE

NO:

Corrective action:

1. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
3. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
4. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
5. INSTALL COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
6. INSTALL MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
7. ASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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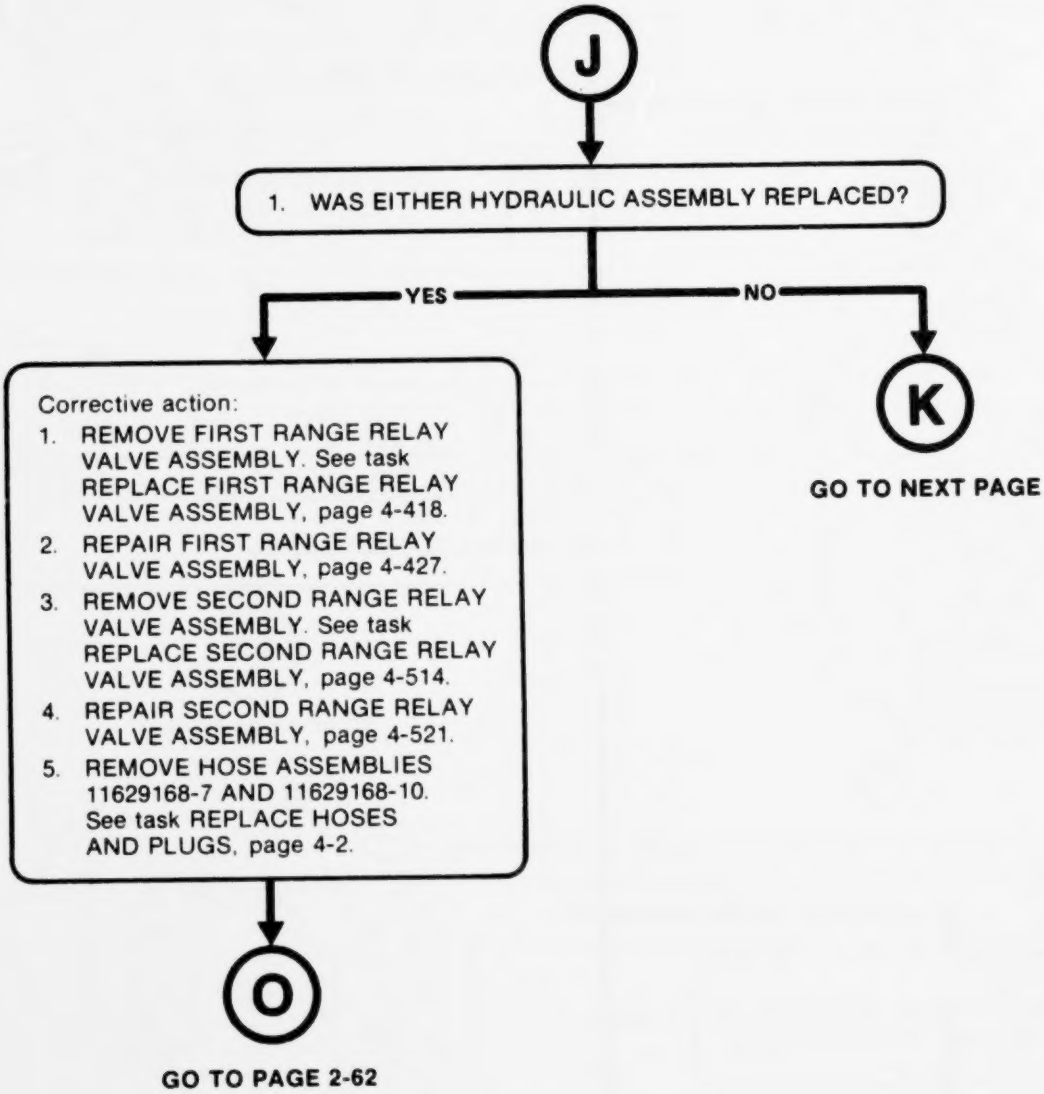

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

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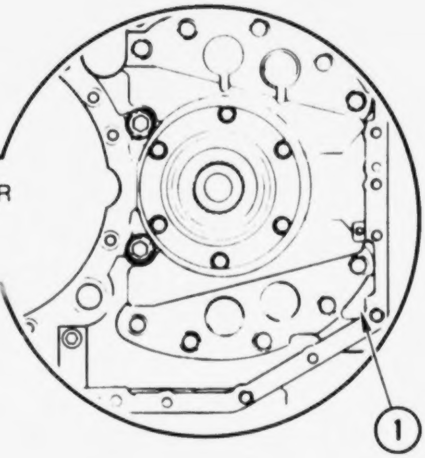
K

1. INSPECT INSIDE OF LEFT SIDE OF MAIN HOUSING (1) FOR CRACKS.
2. HAVE CRACKS BEEN FOUND?

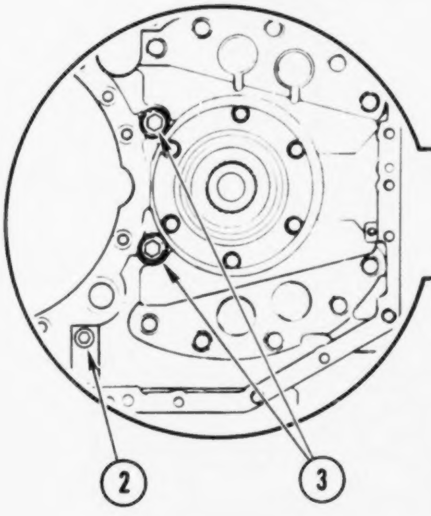


YES

M

GO TO PAGE 2-60

NO



1. INSPECT PLUG 11627748-25 (2), AND TWO PLUGS 11627748-27 (3). See page 2-5.
2. IS ANY PLUG LOOSE OR MISSING?

YES

Corrective action:

1. REPLACE LOOSE OR MISSING PLUGS. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

L

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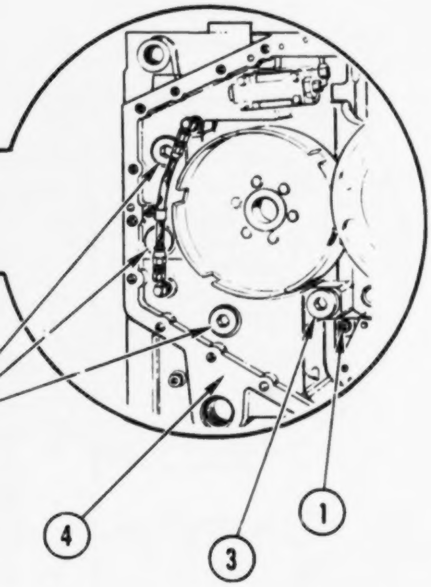
L

1. INSPECT PLUG 11627748-21 (1), THREE PLUGS 11627748-27 (2), AND PLUG 11627748-28 (3). See page 2-5.
2. IS ANY PLUG LOOSE OR MISSING?



YES

Corrective action:

1. REPLACE LOOSE OR MISSING PLUGS. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

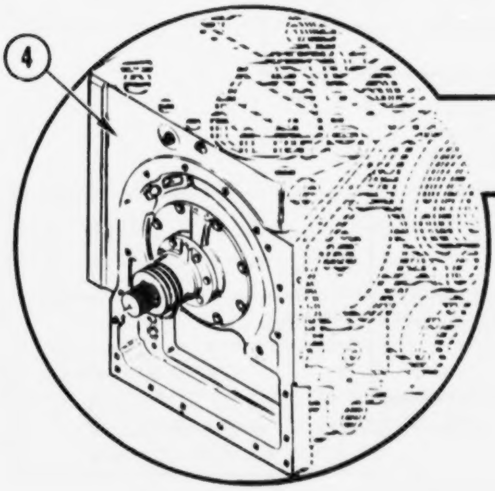
1. INSPECT INSIDE OF RIGHT SIDE OF MAIN HOUSING (4) FOR CRACKS.
2. HAVE CRACKS BEEN FOUND?

YES

M

GO TO NEXT PAGE

NO



1. INSPECT REAR OF HOUSING (4) FOR CRACKS.
2. HAVE CRACKS BEEN FOUND?

YES

M

GO TO NEXT PAGE

NO

N

GO TO PAGE 2-61

M

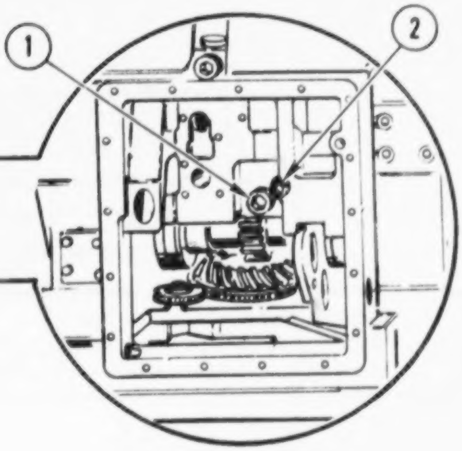
Corrective action:

1. INSTALL LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
6. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
7. INSTALL COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
8. INSTALL MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
9. ASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
10. RECORD DAMAGED MAIN HOUSING ON DA FORM 2407 AND RETURN WITH TRANSMISSION TO DEPOT.

END OF TREE

N

1. INSPECT PLUG 11627748-28 (1) AND PLUG 11627748-25 (2). See page 2-5.
2. IS EITHER PLUG LOOSE OR MISSING.

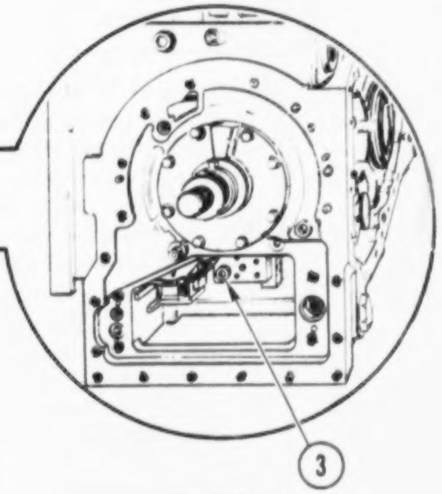


YES

Corrective action:
1. REPLACE LOOSE OR MISSING PLUGS. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. INSPECT PLUG 11627748-21 (3). See page 2-5.
2. IS PLUG LOOSE OR MISSING?

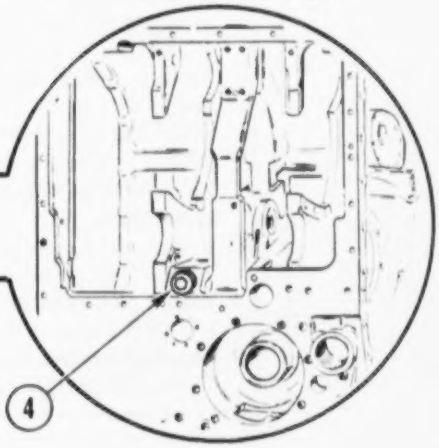


YES

Corrective action:
1. REPLACE LOOSE OR MISSING PLUG. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. INSPECT PLUG 11627748-24 (4). See page 2-5.
2. IS PLUG LOOSE OR MISSING?



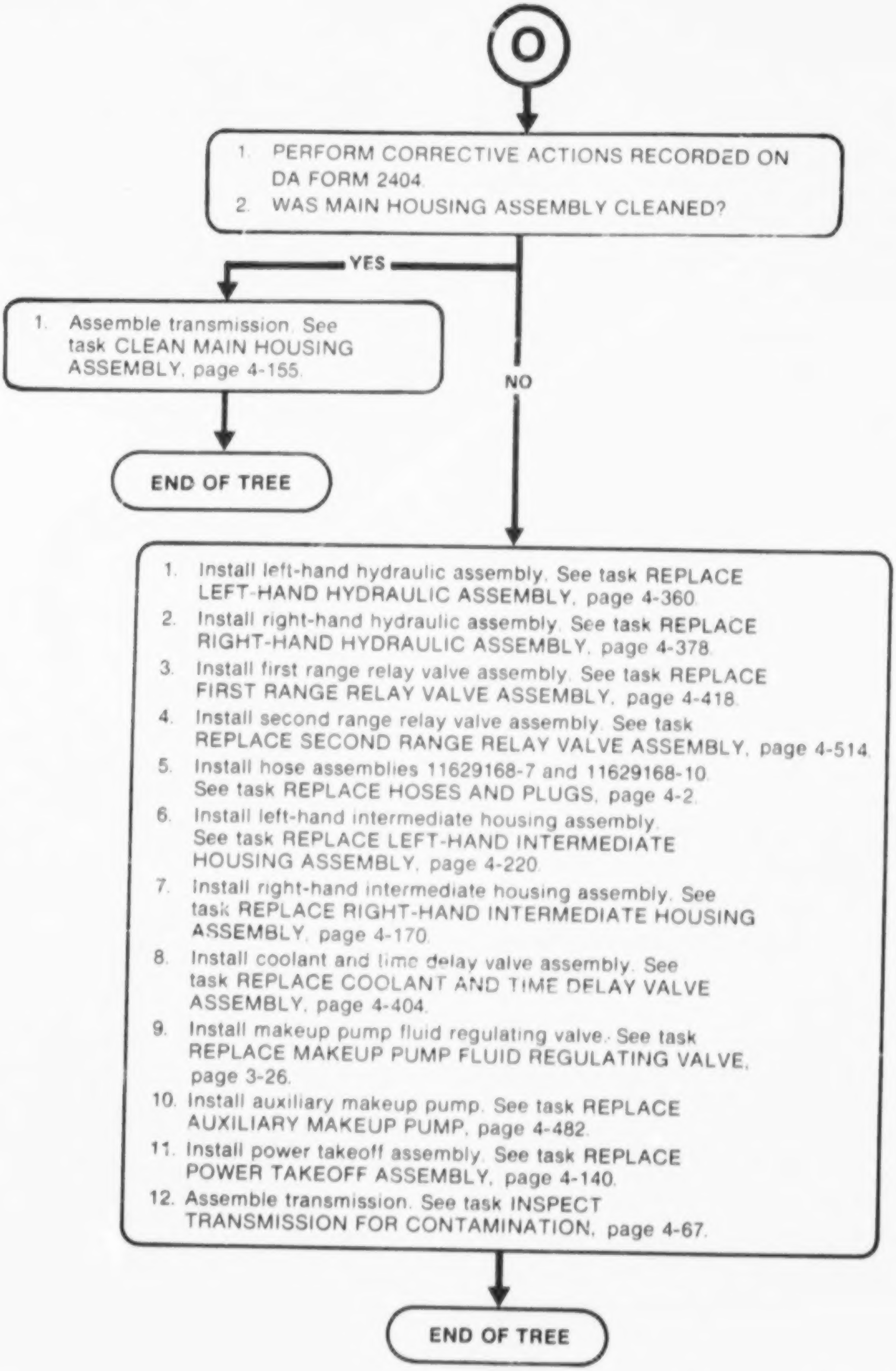
YES

Corrective action:
1. REPLACE LOOSE OR MISSING PLUG. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

P

GO TO PAGE 2-63



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

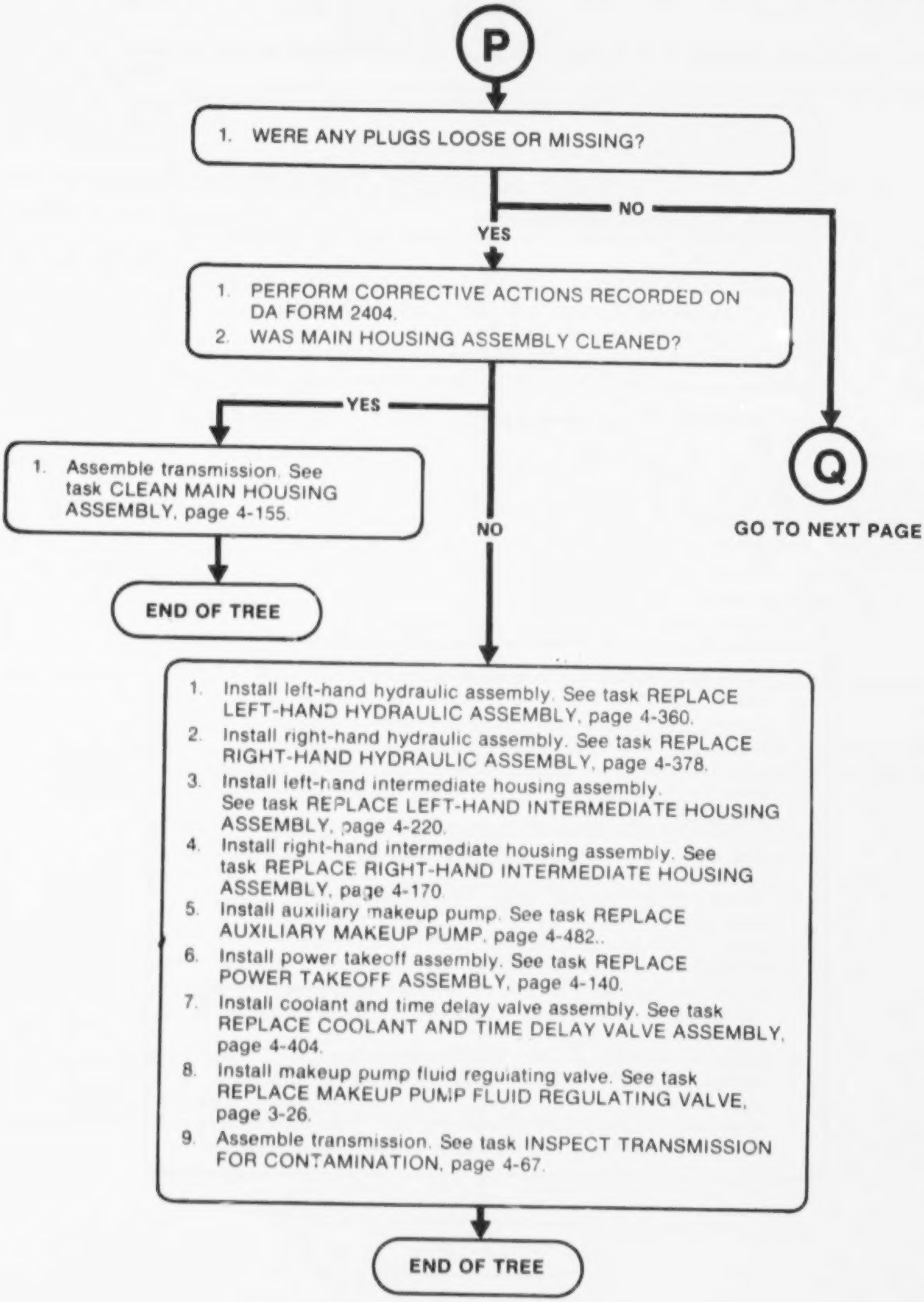
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
7. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
8. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
9. Install makeup pump fluid regulating valve. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
10. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
11. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. WERE ANY PLUGS LOOSE OR MISSING?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

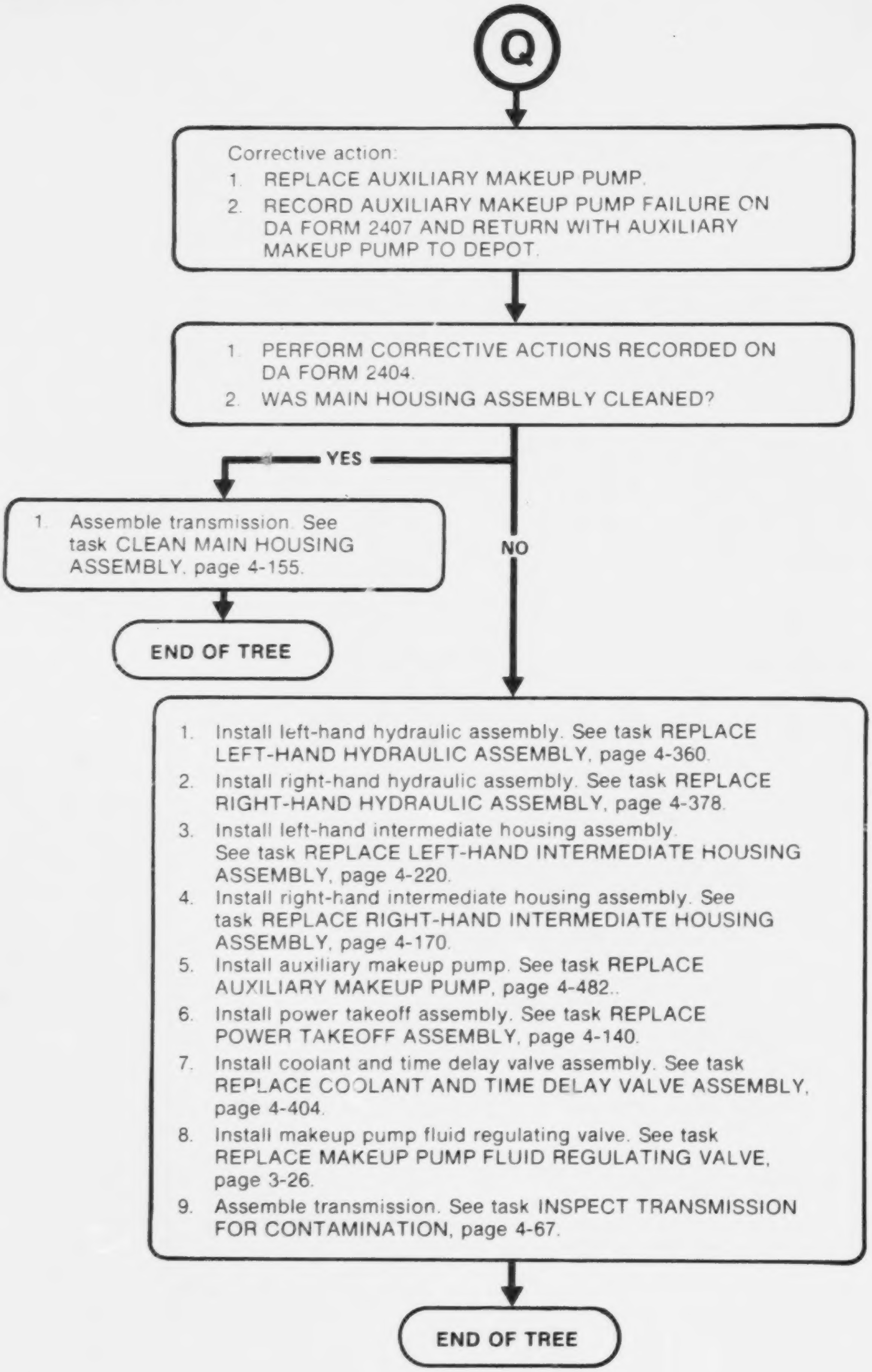
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

GO TO NEXT PAGE

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482..
6. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
7. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
8. Install makeup pump fluid regulating valve. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
9. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



Corrective action:

1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN WITH AUXILIARY MAKEUP PUMP TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482..
6. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
7. Install coolant and time delay valve assembly. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.
8. Install makeup pump fluid regulating valve. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.
9. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

NO FULL STEER

DESCRIPTION

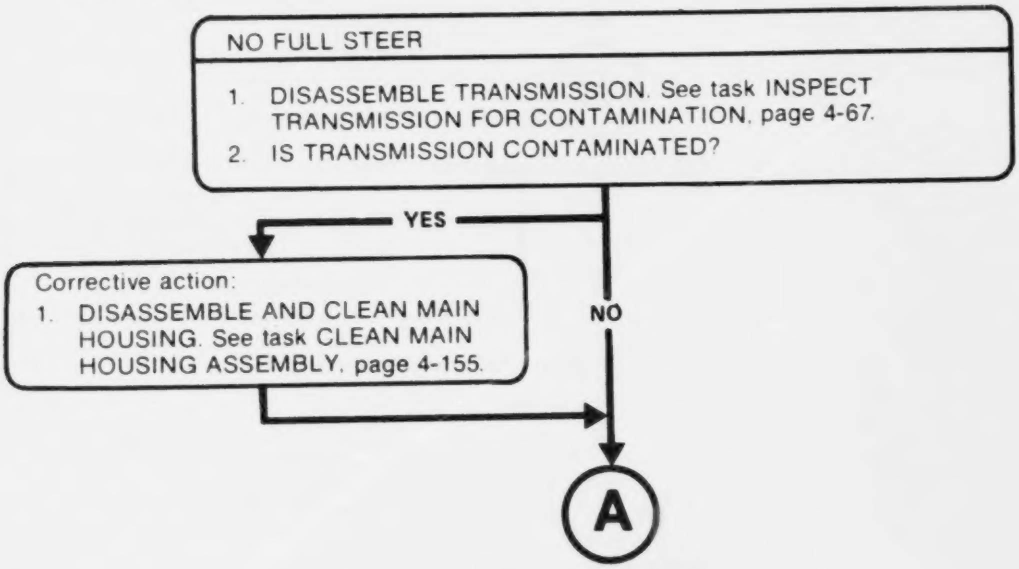
This tree covers inspection for a fault causing no full steer and for making repairs when the fault is found.

INITIAL SETUP

Tools:	References:
Drag wrench — (Item 24, App C) General mechanic's tool kit: automotive — (Item 33, App C)	DA PAM 738-750 DA Form 2404 DA Form 2407
Personnel Required:	**Equipment Conditions:**
Track Veh Rep 63H10	Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



NO FULL STEER

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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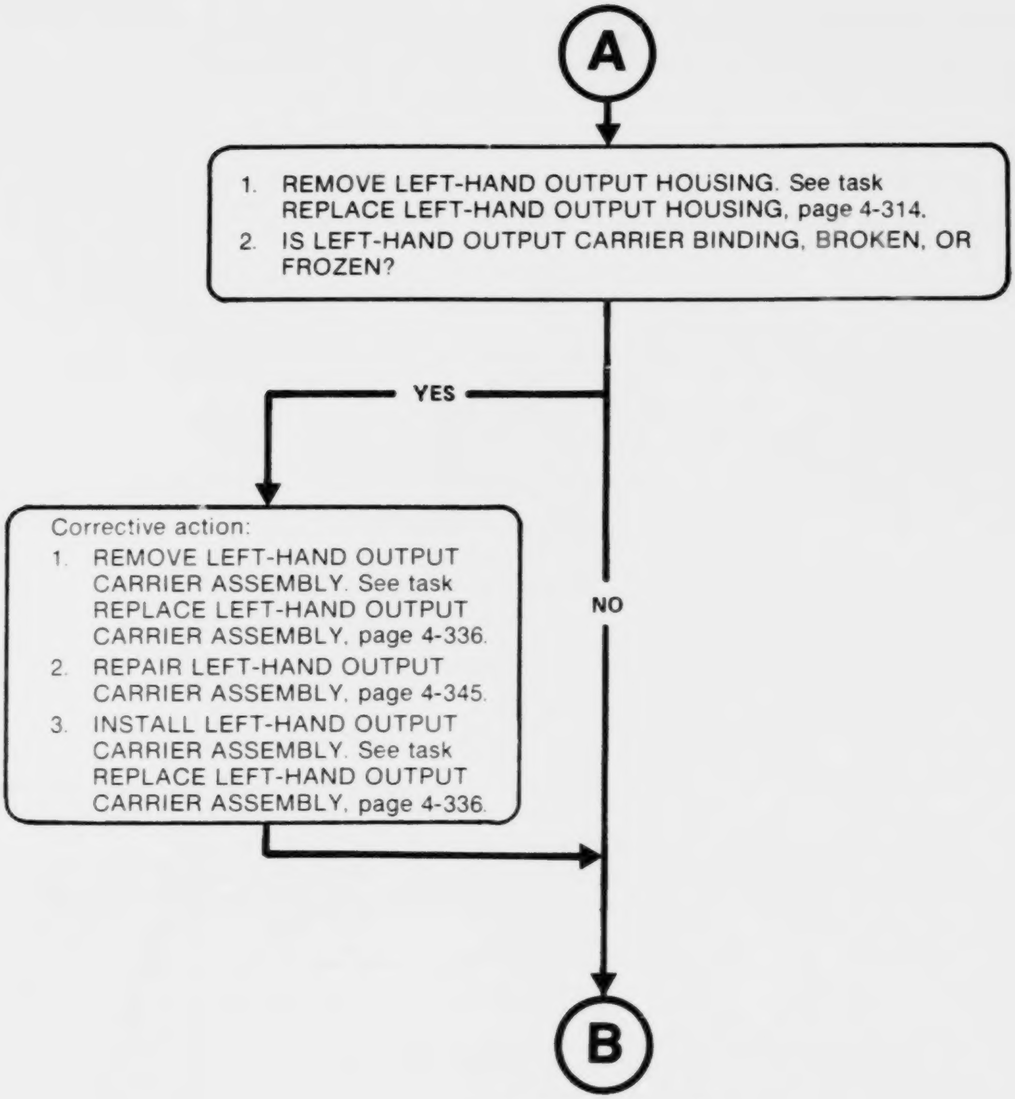

1. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
2. IS LEFT-HAND OUTPUT CARRIER BINDING, BROKEN, OR FROZEN?

Corrective action:

1. REMOVE LEFT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-336.
2. REPAIR LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-345.
3. INSTALL LEFT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-336.

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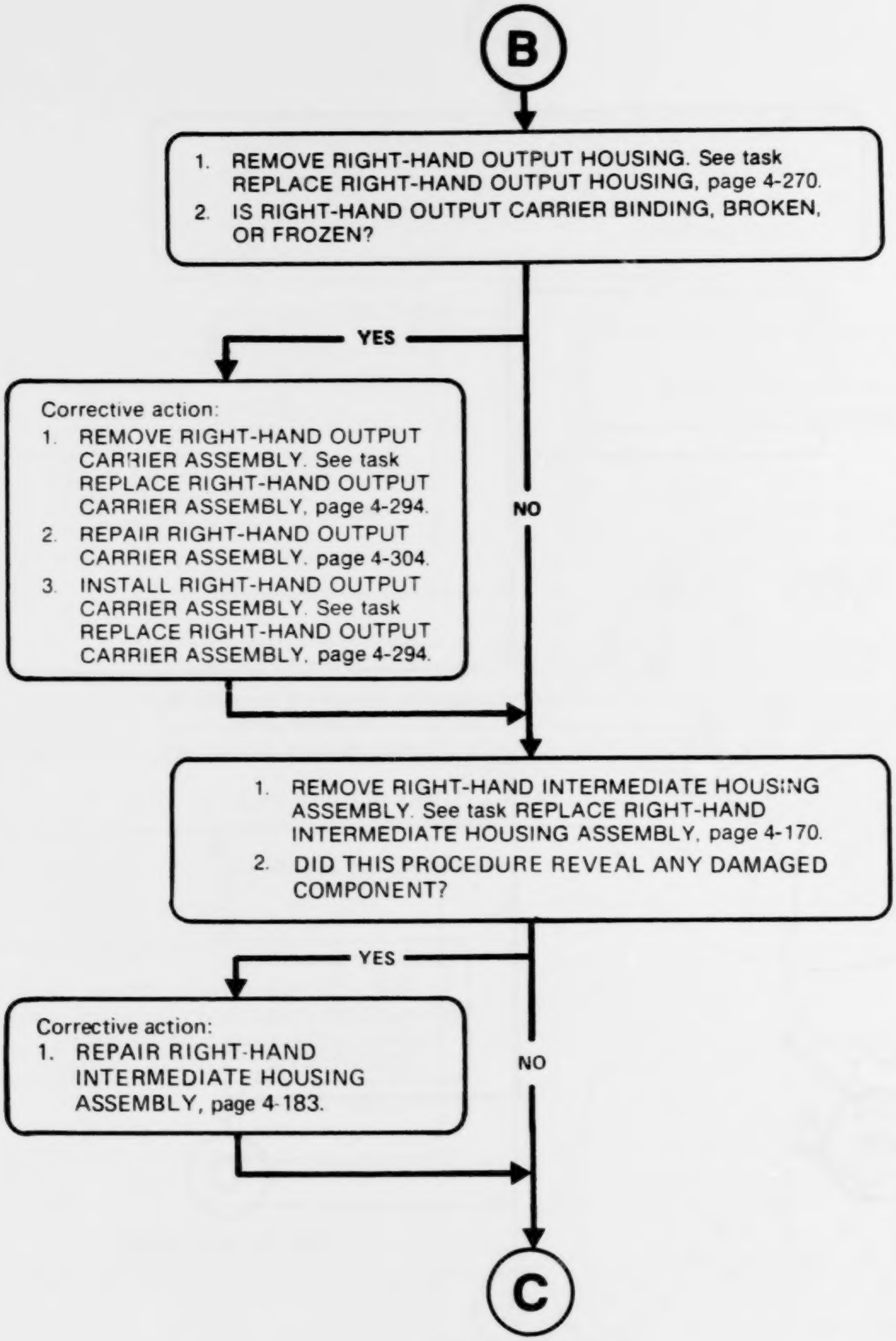

1. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
2. IS RIGHT-HAND OUTPUT CARRIER BINDING, BROKEN, OR FROZEN?

Corrective action:
1. REMOVE RIGHT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-294.
2. REPAIR RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-304.
3. INSTALL RIGHT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-294.

1. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. DID THIS PROCEDURE REVEAL ANY DAMAGED COMPONENT?

Corrective action:
1. REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-183.

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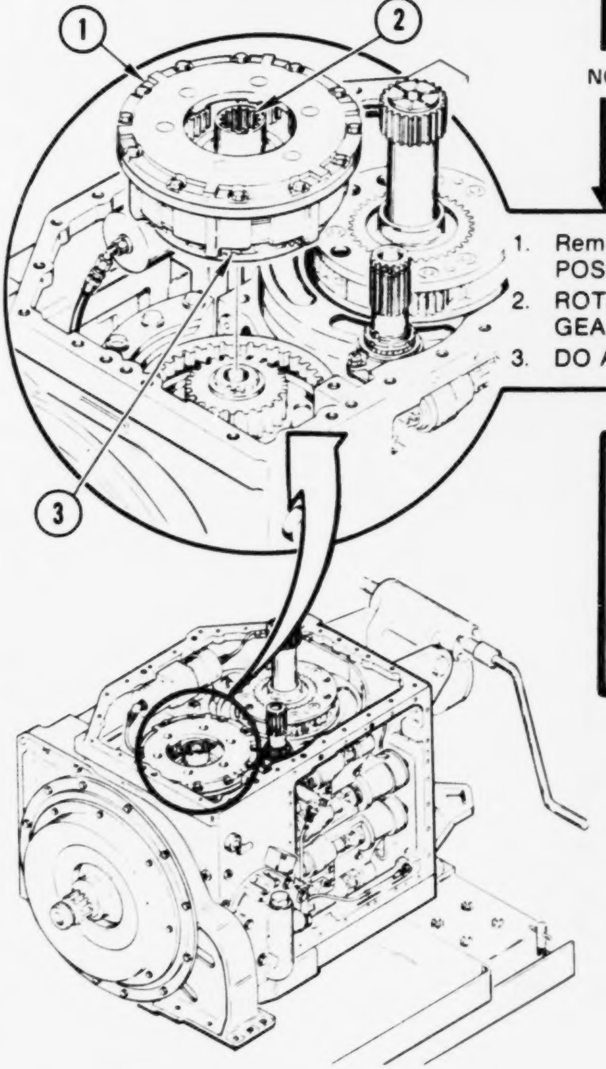
1. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. DID THIS PROCEDURE REVEAL ANY DAMAGED COMPONENT?

YES

Corrective action:

1. REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-236.

NO



1. Remove positive clutch (1). See task REPLACE POSITIVE CLUTCH, page 4-356.
2. ROTATE SPLINED SHAFT (2) AND SIX OUTER SPUR GEARS (3).
3. DO ALL GEARS ROTATE FREELY?

YES

NO

Corrective action:

1. REPLACE POSITIVE CLUTCH.
2. RECORD POSITIVE CLUTCH FAILURE ON DA FORM 2407 AND RETURN WITH POSITIVE CLUTCH TO DEPOT.

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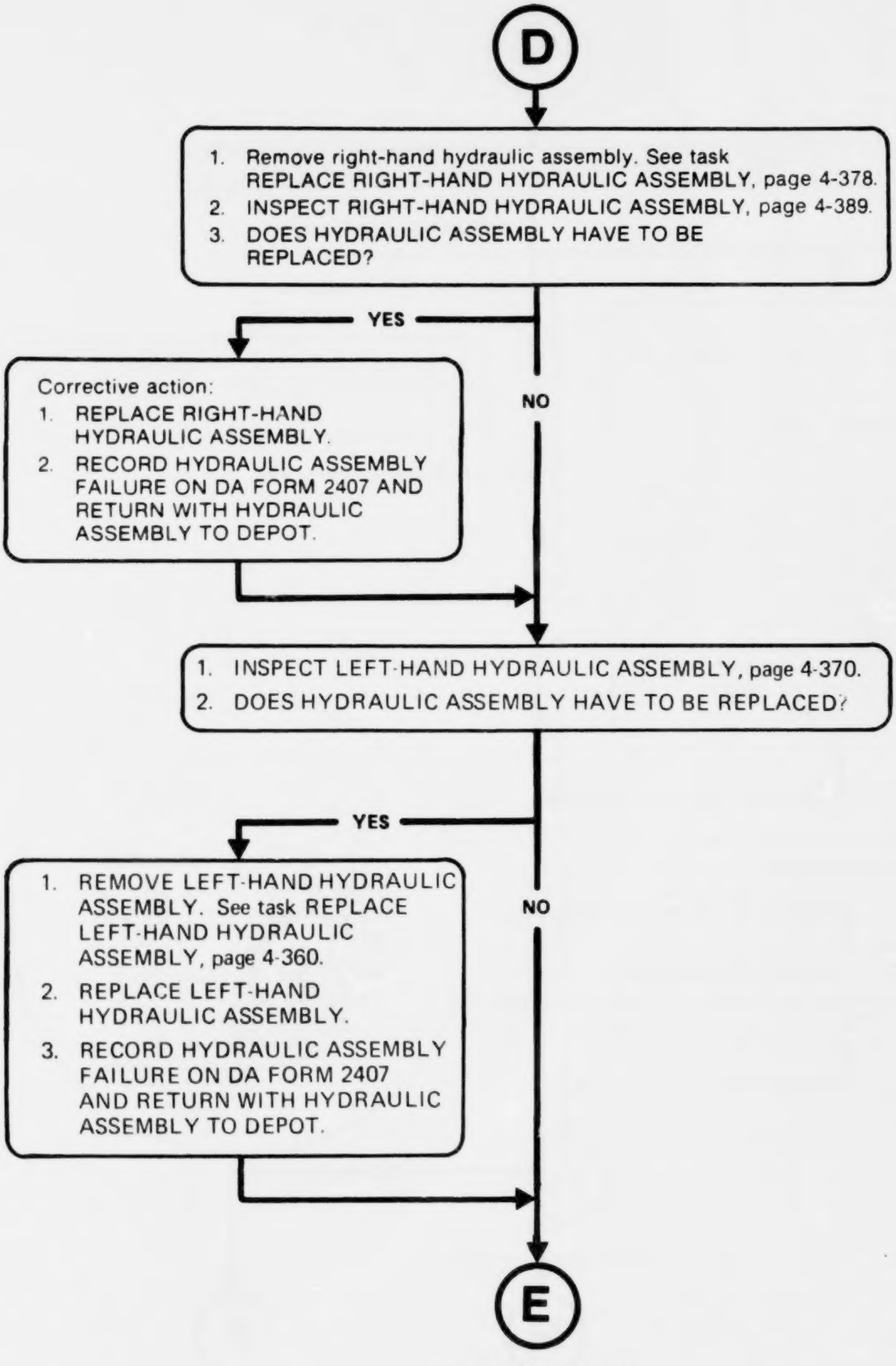

1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:
1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

1. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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E

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

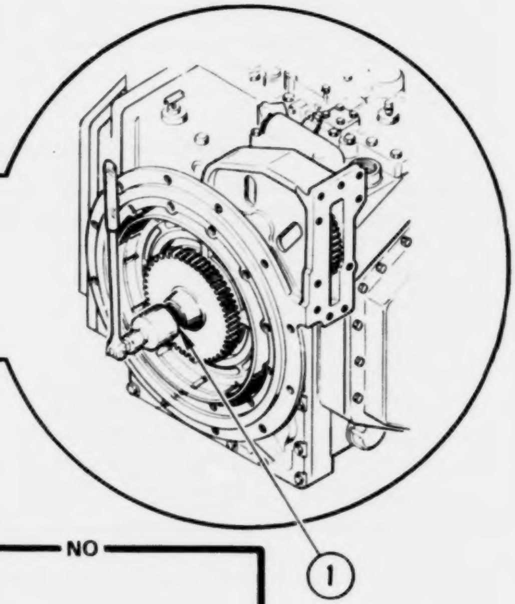
YES

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. Remove disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. USING DRAG WRENCH, ROTATE INPUT BEVEL SHAFT (1).
3. DOES SHAFT (1) ROTATE FREELY?



YES

H

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NO

F

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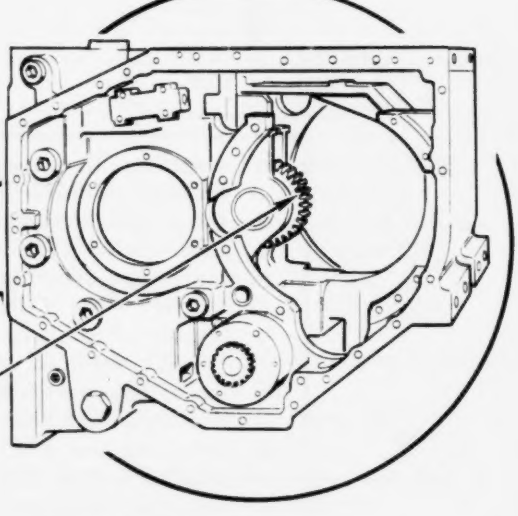
1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. ARE GEARS DAMAGED?

YES

Corrective action:
1. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.

NO

1. ROTATE SPUR GEAR (1).
2 DOES GEAR (1) ROTATE FREELY?



NO

Corrective action:
1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

YES

G

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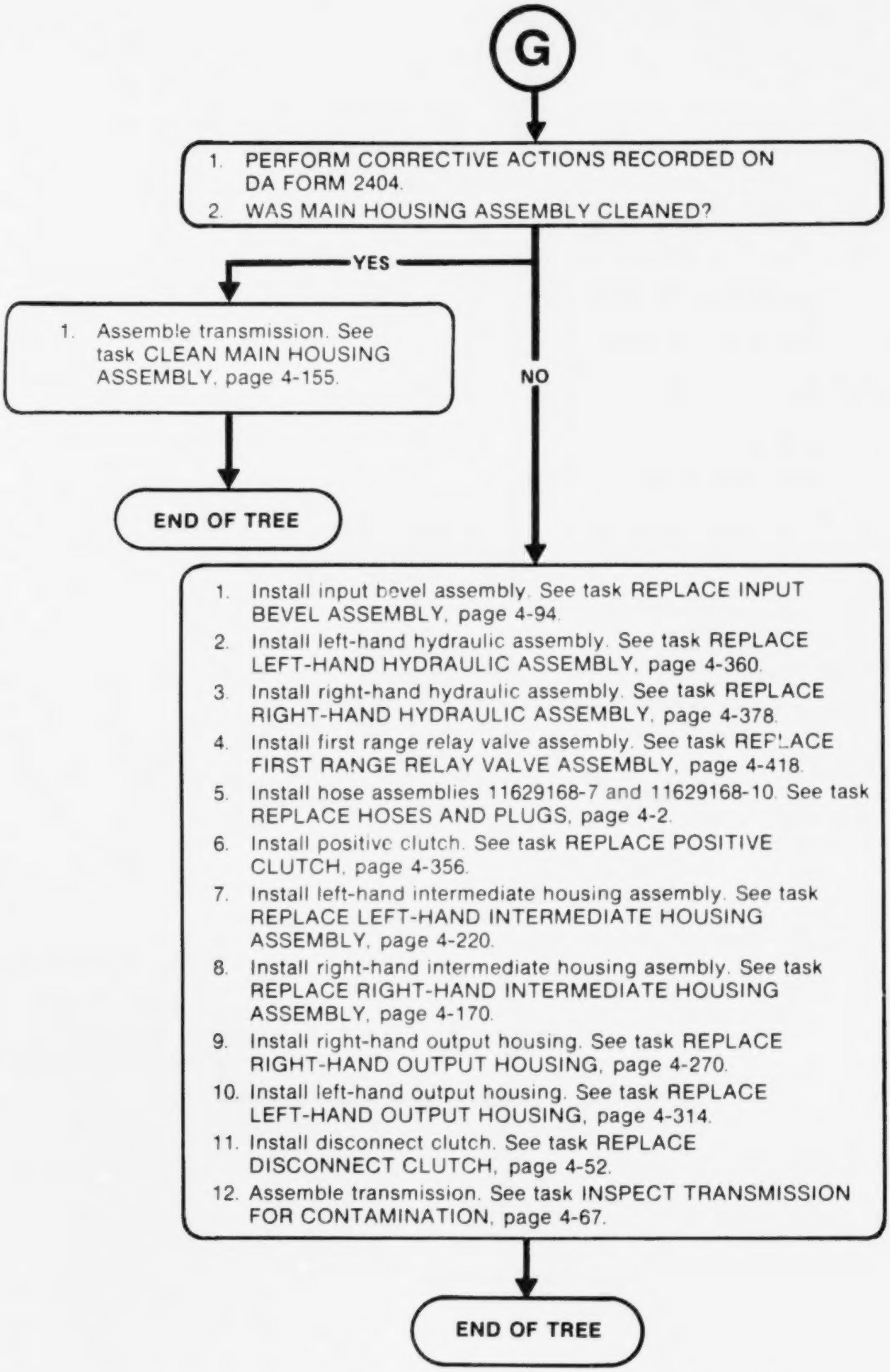
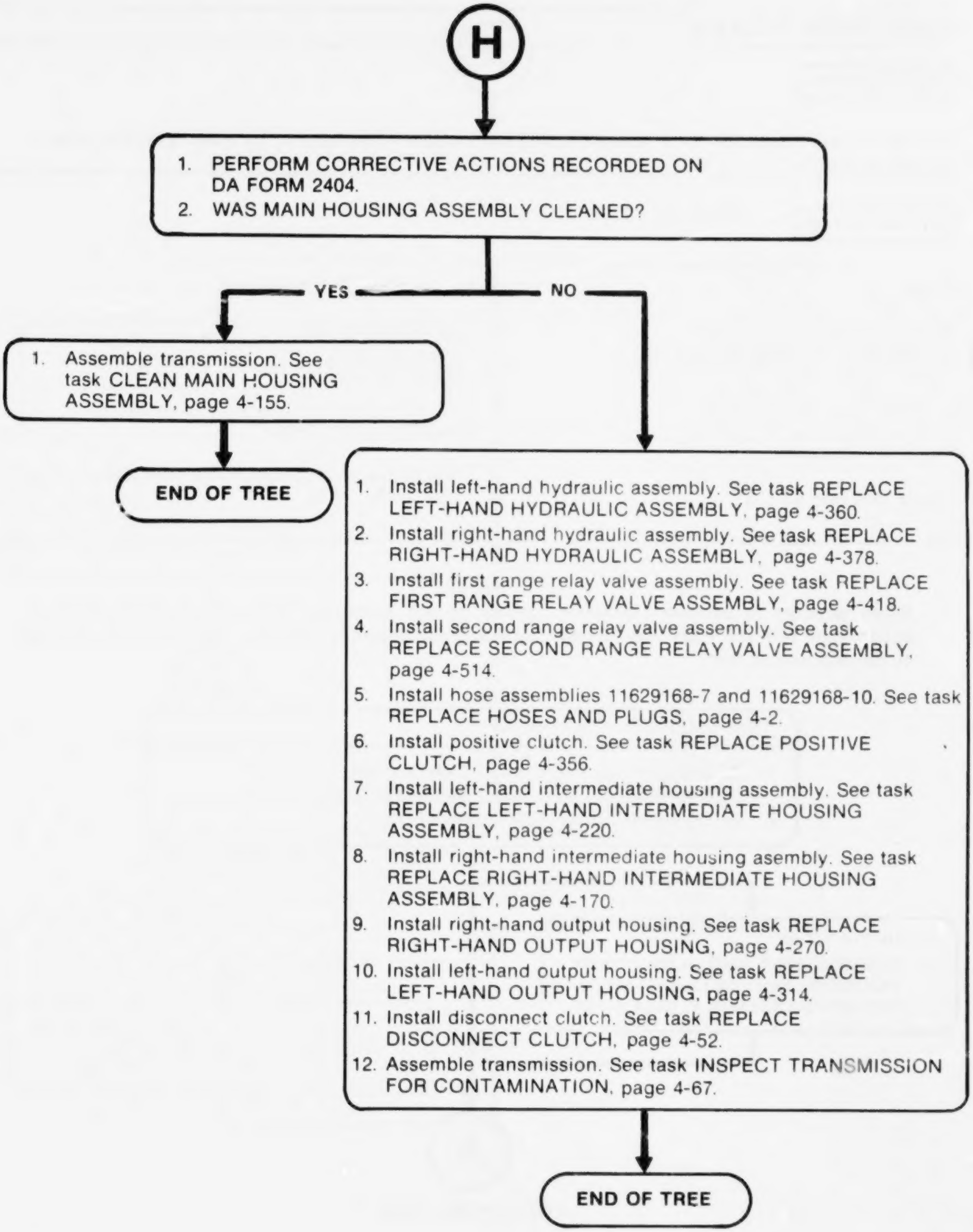


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
3. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
4. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
8. Install right-hand intermediate housing asembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. Install right-hand output housing. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
10. Install left-hand output housing. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
11. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
8. Install right-hand intermediate housing asembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. Install right-hand output housing. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
10. Install left-hand output housing. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
11. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

TRANSMISSION ROLLBACK

DESCRIPTION

This tree covers inspection for a failure causing transmission rollback and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

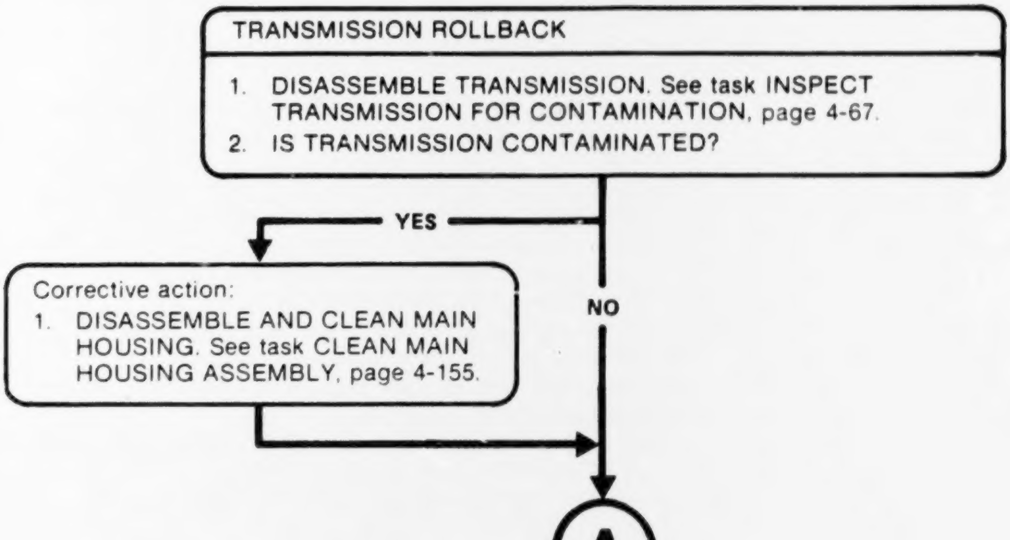
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



TRANSMISSION ROLLBACK

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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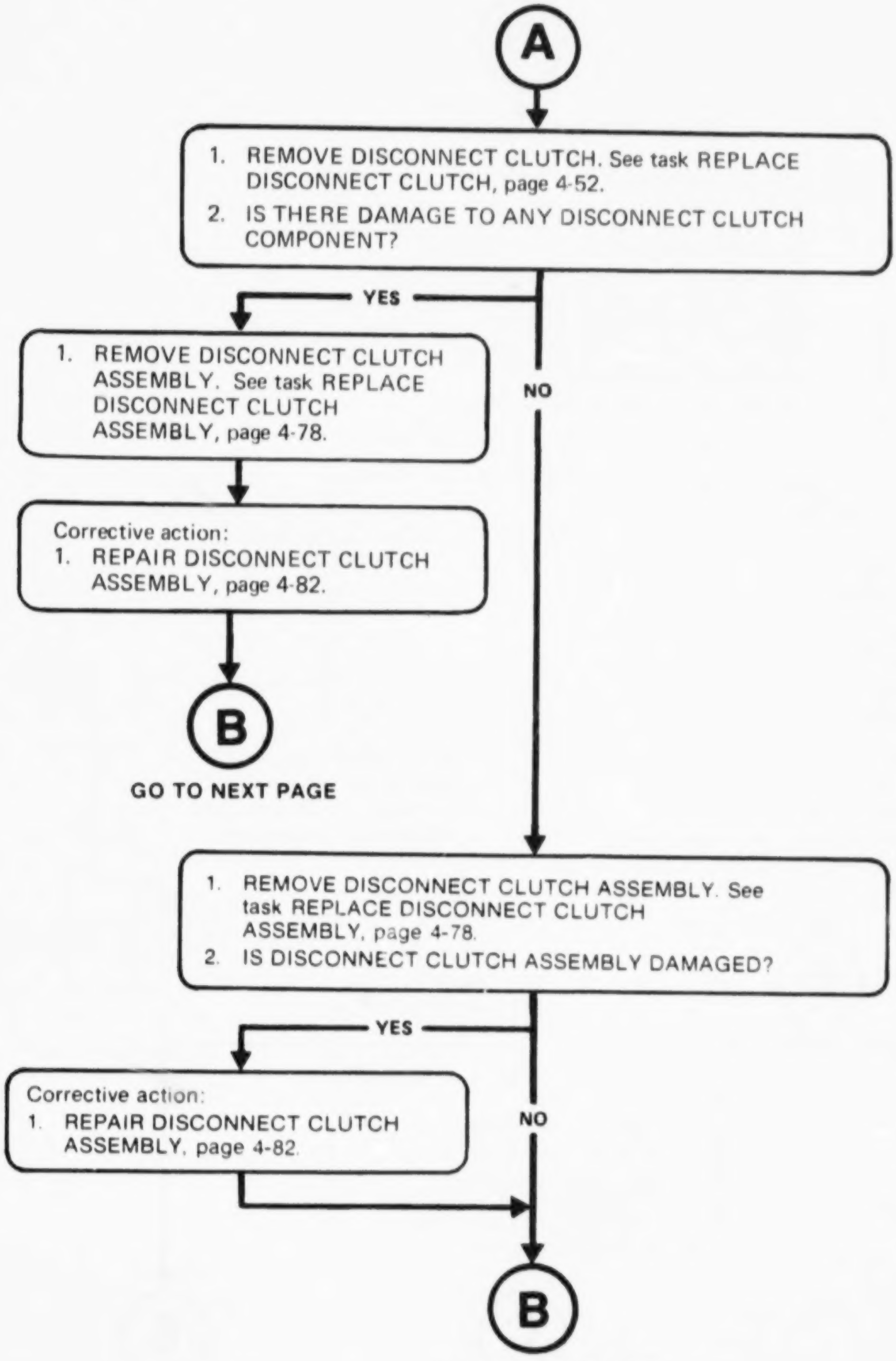

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. IS THERE DAMAGE TO ANY DISCONNECT CLUTCH COMPONENT?

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. IS DISCONNECT CLUTCH ASSEMBLY DAMAGED?

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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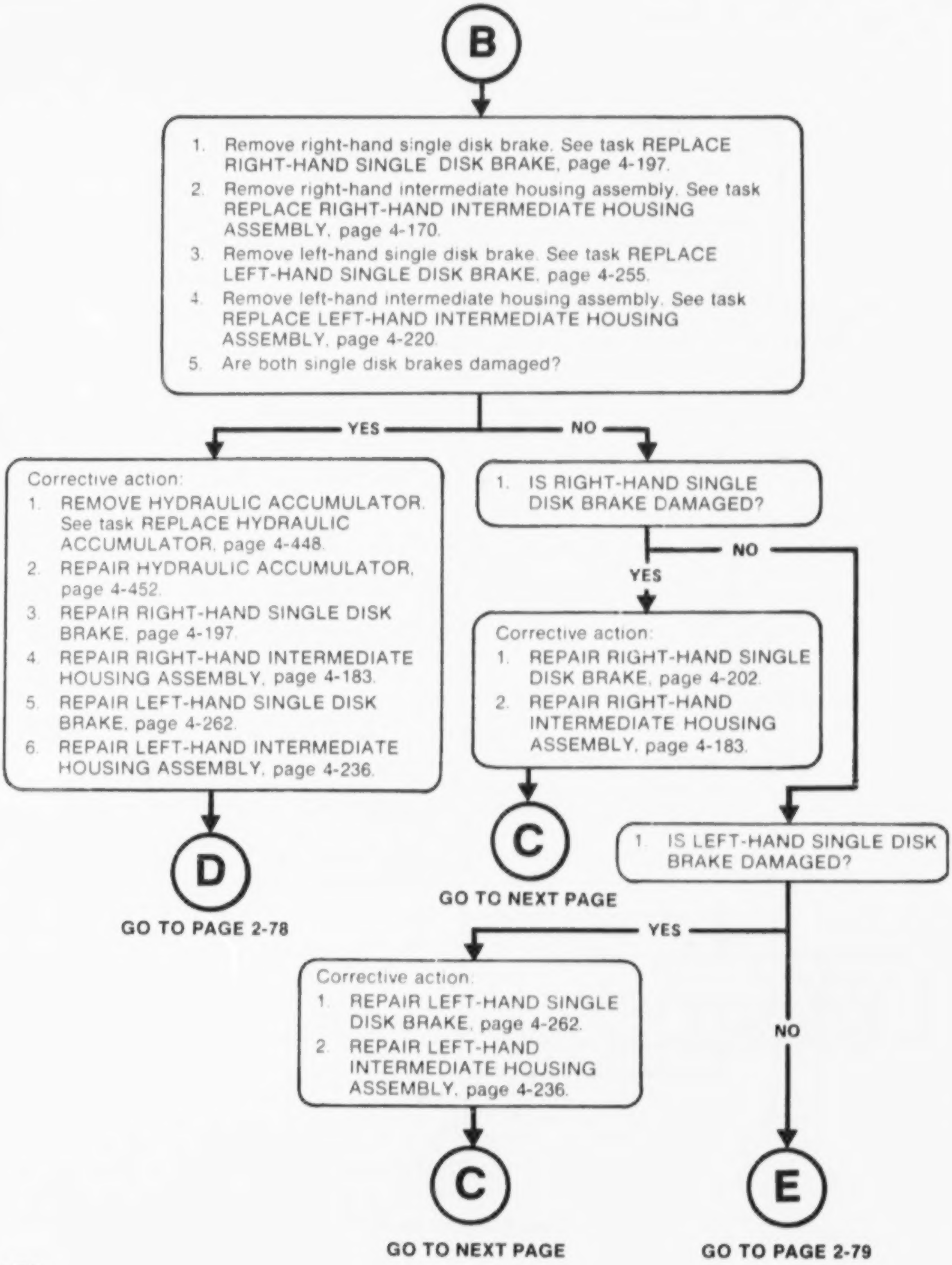

1. Remove right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
2. Remove right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
3. Remove left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
4. Remove left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
5. Are both single disk brakes damaged?

Corrective action:

1. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.
2. REPAIR HYDRAULIC ACCUMULATOR, page 4-452.
3. REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
4. REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-183.
5. REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.
6. REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-236.

1. IS RIGHT-HAND SINGLE DISK BRAKE DAMAGED?

Corrective action:

1. REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-202.
2. REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-183.

1. IS LEFT-HAND SINGLE DISK BRAKE DAMAGED?

Corrective action:

1. REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.
2. REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-236.

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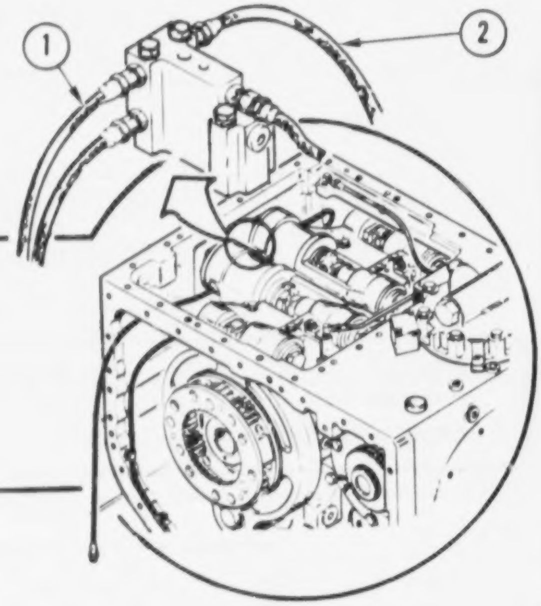

1. Remove positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
2. Remove spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
3. INSPECT HOSE ASSEMBLIES 11629168-1 (1) and 11629168-3 (2). See page 2-5.
4. IS ANY HOSE ASSEMBLY DAMAGED?

YES

Corrective action:

1. REPLACE DAMAGED HOSE. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

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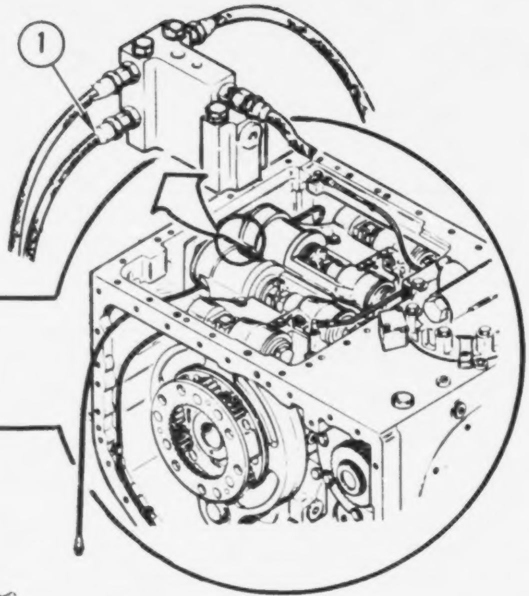
D

1. INSPECT HOSE ASSEMBLY 11629168-10 (1). See page 2-5.
2. IS HOSE ASSEMBLY DAMAGED?

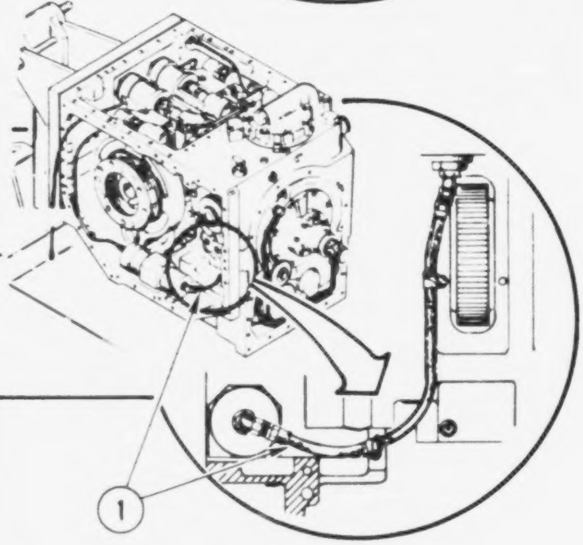


YES

Corrective action:
1. REPLACE DAMAGED HOSE. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. INSPECT HOSE ASSEMBLY 11627588-11 (1). See page 2-5.
2. IS HOSE ASSEMBLY DAMAGED?



YES

Corrective action:
1. REPLACE DAMAGED HOSE. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

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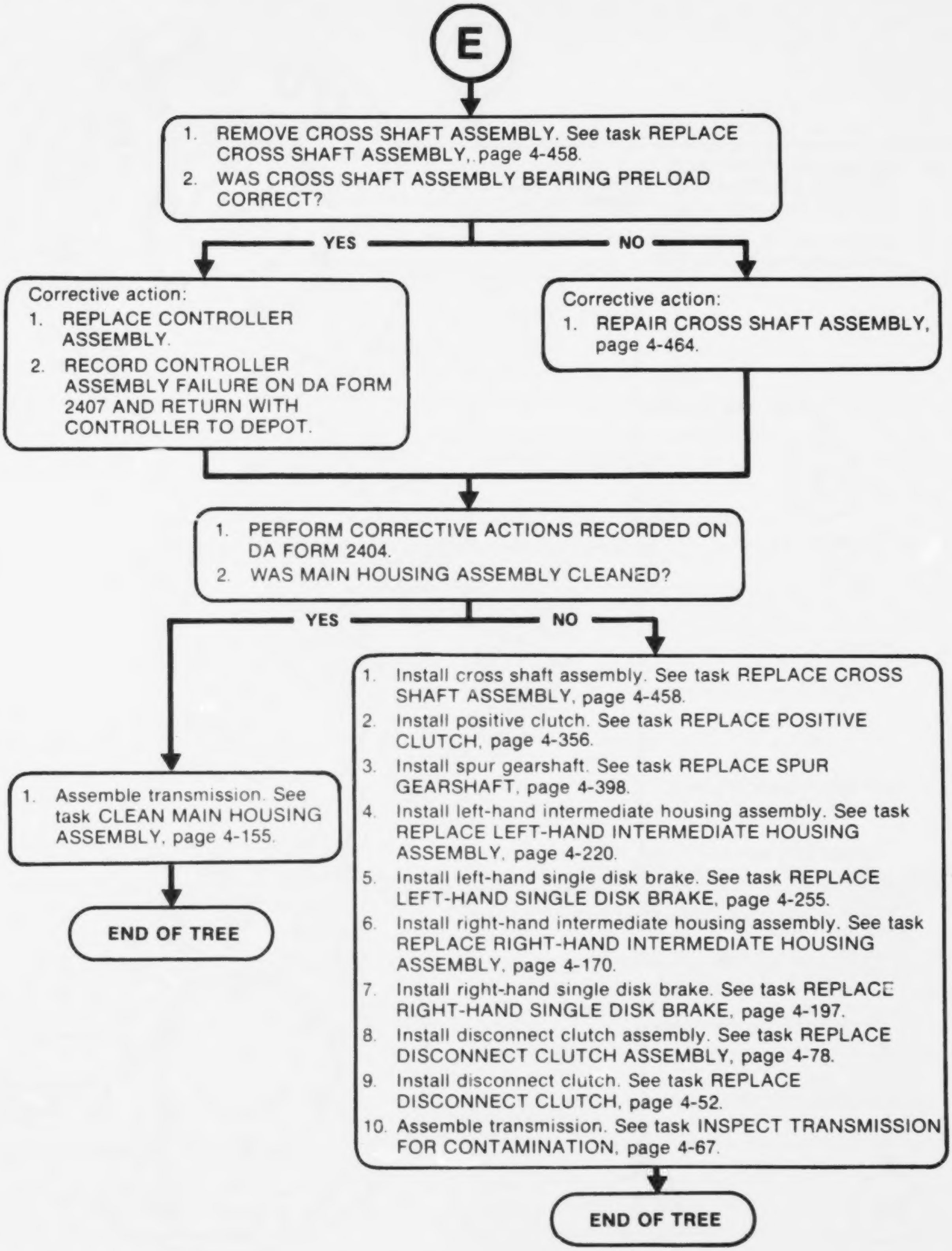


1. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
2. WAS CROSS SHAFT ASSEMBLY BEARING PRELOAD CORRECT?

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER TO DEPOT.

Corrective action:

1. REPAIR CROSS SHAFT ASSEMBLY, page 4-464.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install cross shaft assembly. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
2. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
3. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
4. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
5. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
6. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
7. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
8. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
9. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

F

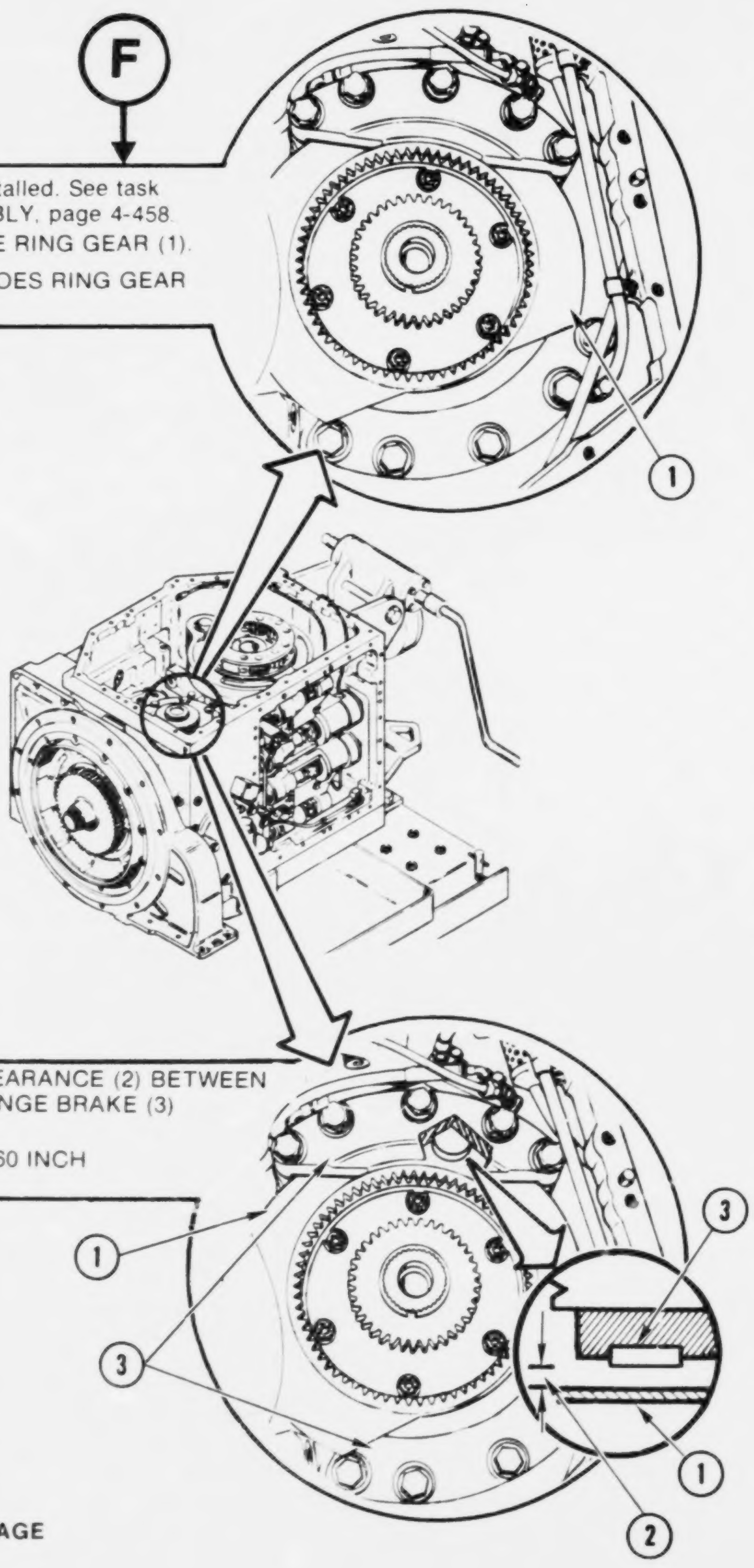
1. Remove cross shaft assembly if installed. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
2. INSPECT SECOND RANGE BRAKE RING GEAR (1).
3. IS RING GEAR (1) SCORED OR DOES RING GEAR HAVE SURFACE CRACKS?

YES

G

GO TO NEXT PAGE

NO



1. USING FEELER GAGE, CHECK CLEARANCE (2) BETWEEN TWO PADS ON EACH SECOND RANGE BRAKE (3) AND RING GEAR (1).
2. IS EACH CLEARANCE (2) 0.021-0.060 INCH (0.53-1.52 mm)?

YES

H

GO TO PAGE 2-82

NO

G

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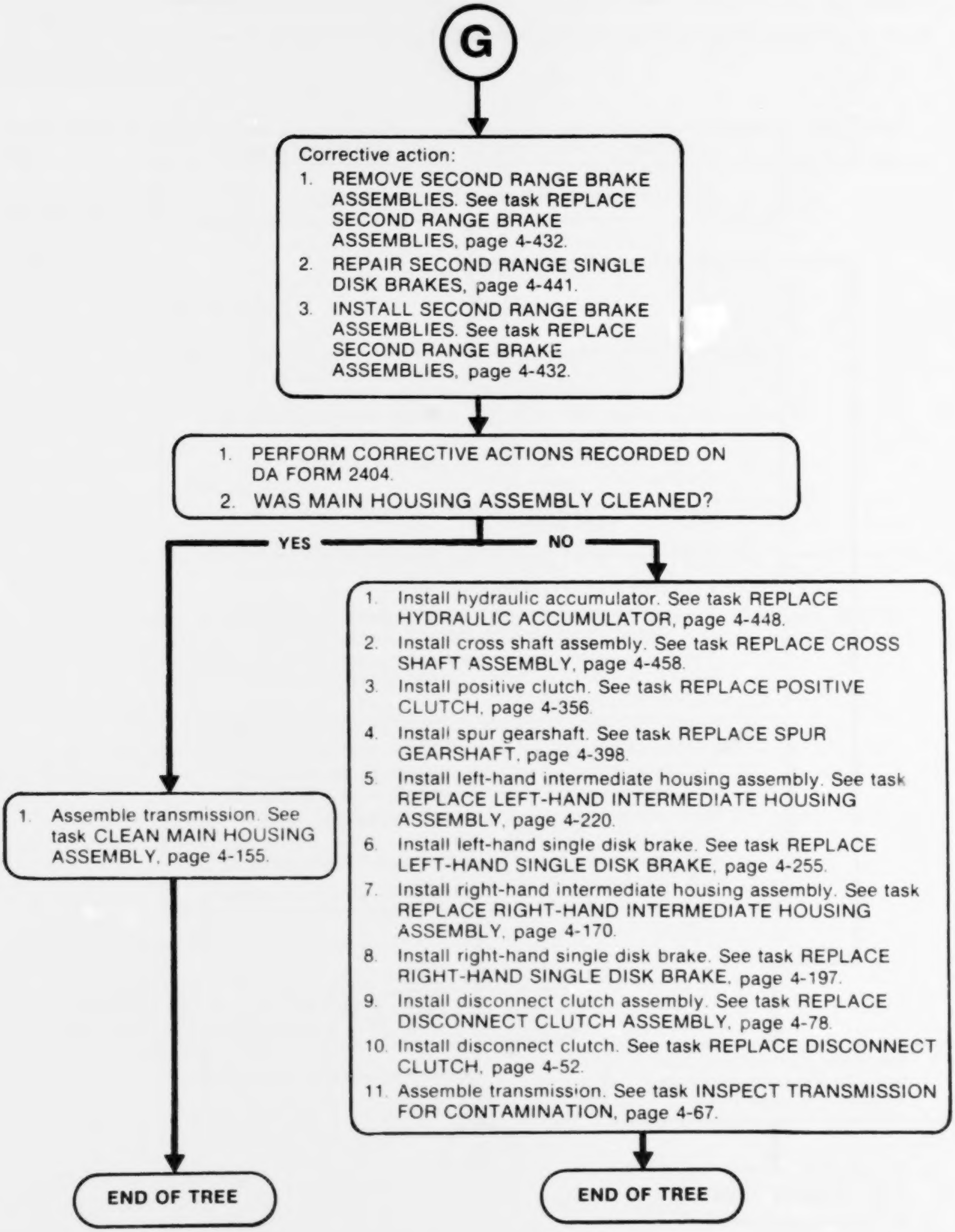


Corrective action:

1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.
3. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

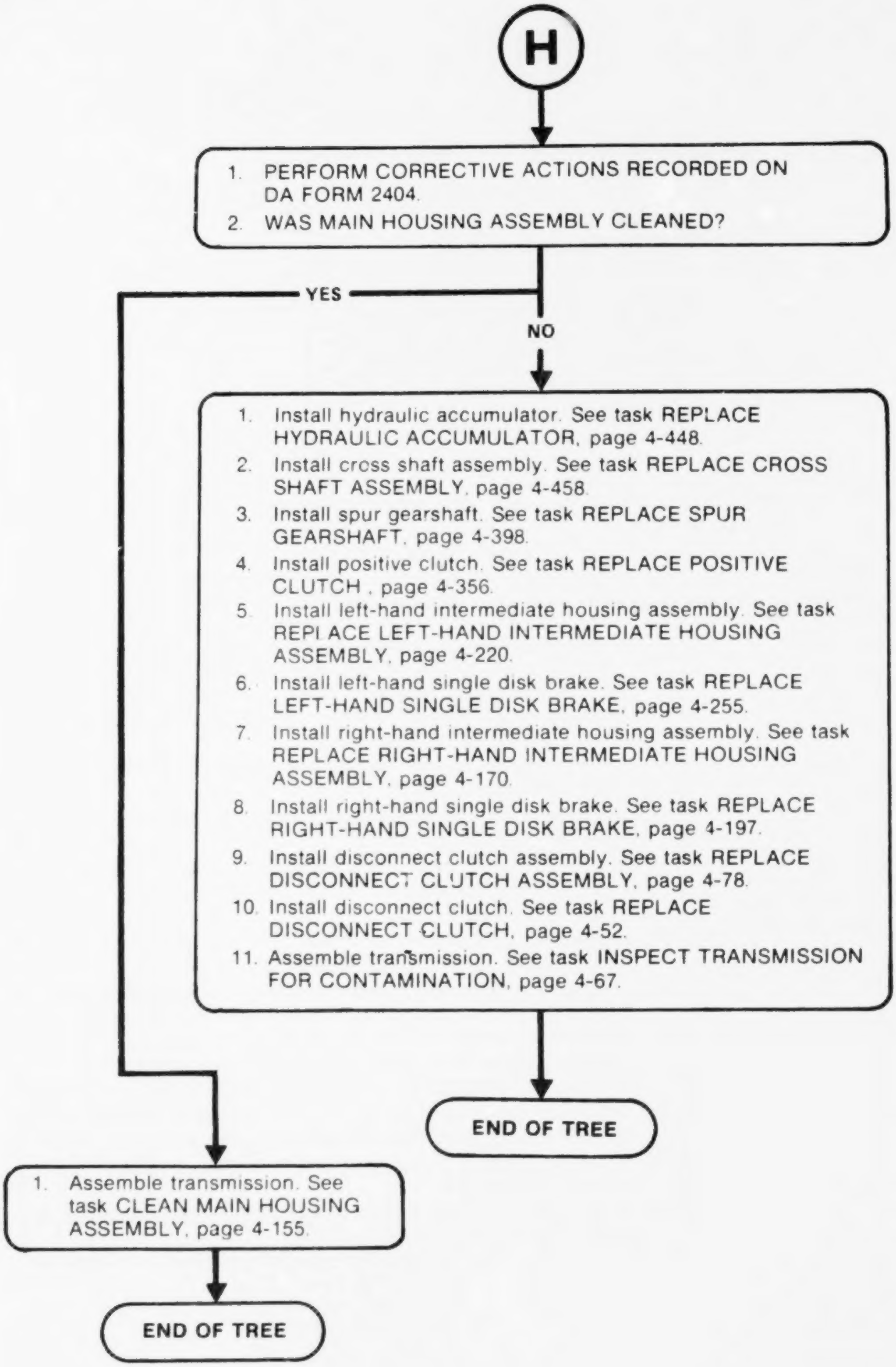
1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

NO:

1. Install hydraulic accumulator. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.
2. Install cross shaft assembly. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
3. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
4. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
5. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
7. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
8. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
9. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
10. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
11. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Install hydraulic accumulator. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.
2. Install cross shaft assembly. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
3. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
4. Install positive clutch. See task REPLACE POSITIVE CLUTCH , page 4-356.
5. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
7. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
8. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
9. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
10. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
11. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

FROZEN INPUT

DESCRIPTION

This tree covers inspection for a fault causing a frozen input and for making repairs when the fault is found.

INITIAL SETUP

Tools:

Drag wrench — (Item 24, App C)
General mechanic's tool kit:
 automotive — (Item 33, App C)
Socket wrench adapter — (Item 74, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Wood block (2) — (Item 6, App D)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

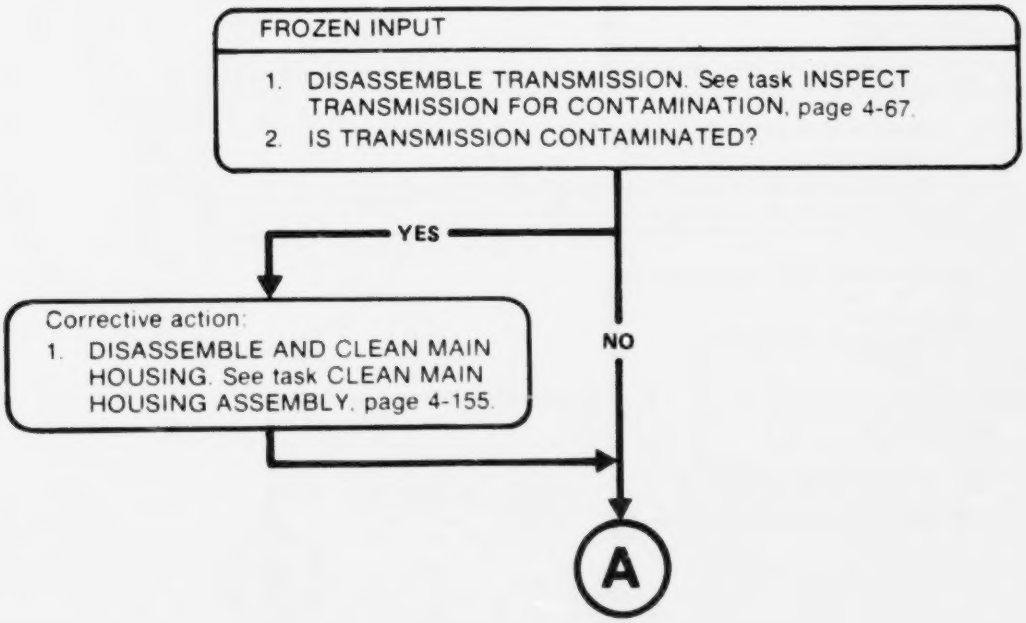
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



FROZEN INPUT

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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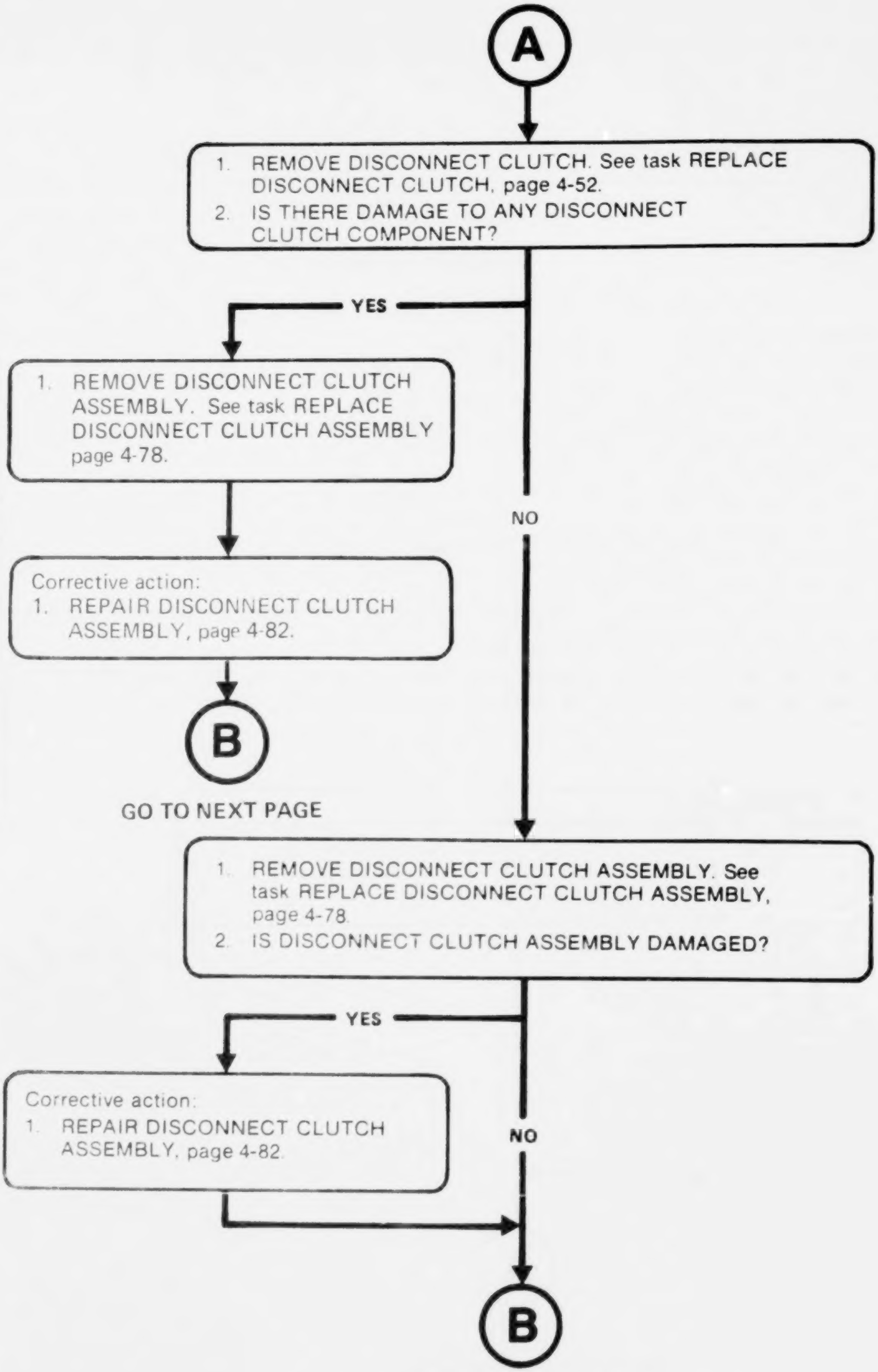

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. IS THERE DAMAGE TO ANY DISCONNECT CLUTCH COMPONENT?

YES:

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY page 4-78.

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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NO:

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. IS DISCONNECT CLUTCH ASSEMBLY DAMAGED?

YES:

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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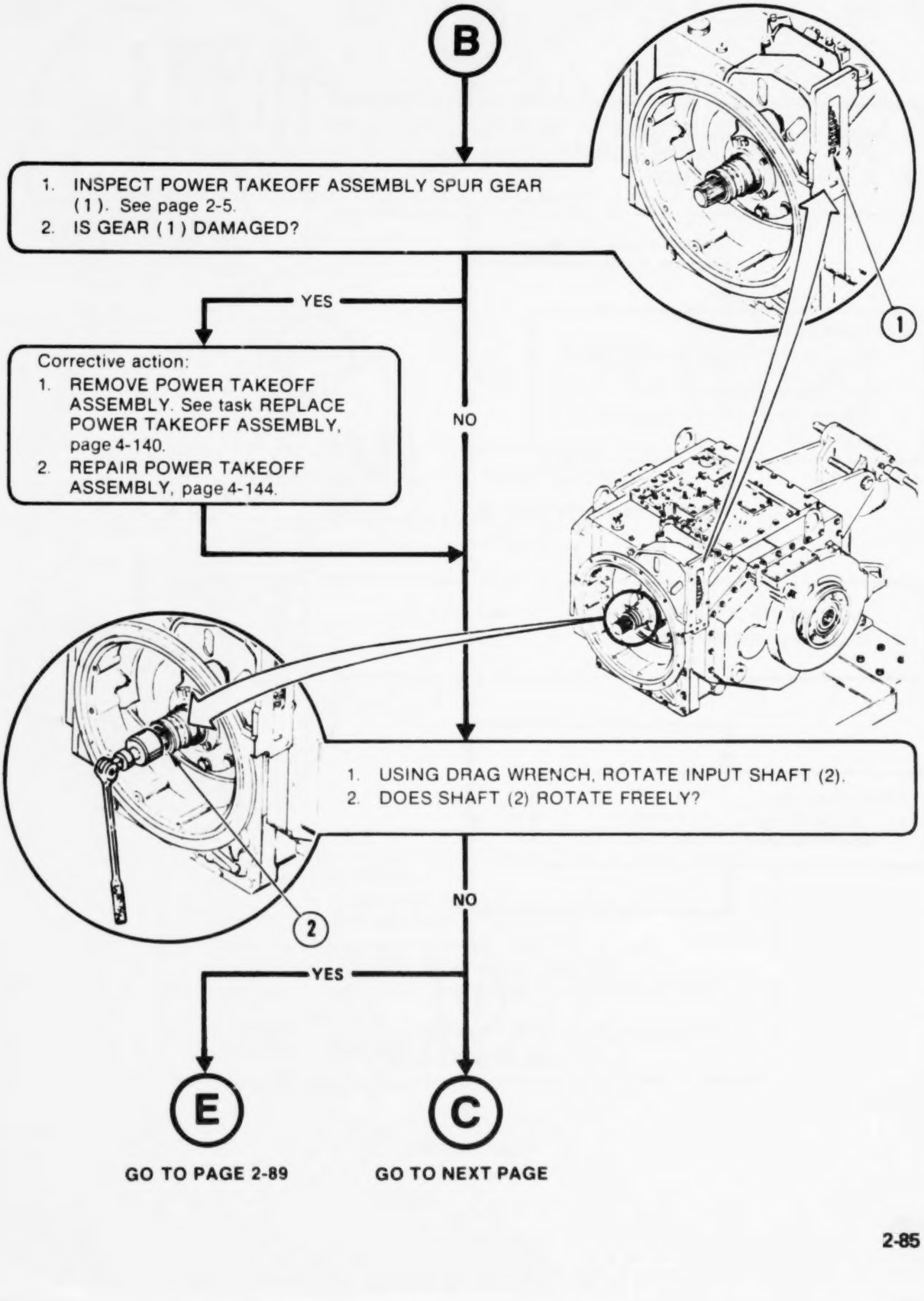

1. INSPECT POWER TAKEOFF ASSEMBLY SPUR GEAR (1). See page 2-5.
2. IS GEAR (1) DAMAGED?

Corrective action:

1. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. REPAIR POWER TAKEOFF ASSEMBLY, page 4-144.

1. USING DRAG WRENCH, ROTATE INPUT SHAFT (2).
2. DOES SHAFT (2) ROTATE FREELY?

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GO TO NEXT PAGE

C

1. INSPECT INPUT BEVEL GEAR (1), SPIRAL BEVEL PINION GEAR (2), AND SPUR GEARSHAFT (3). See page 2-5.
2. IS ANY GEAR DAMAGED?

YES

Corrective action:

1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.

NO

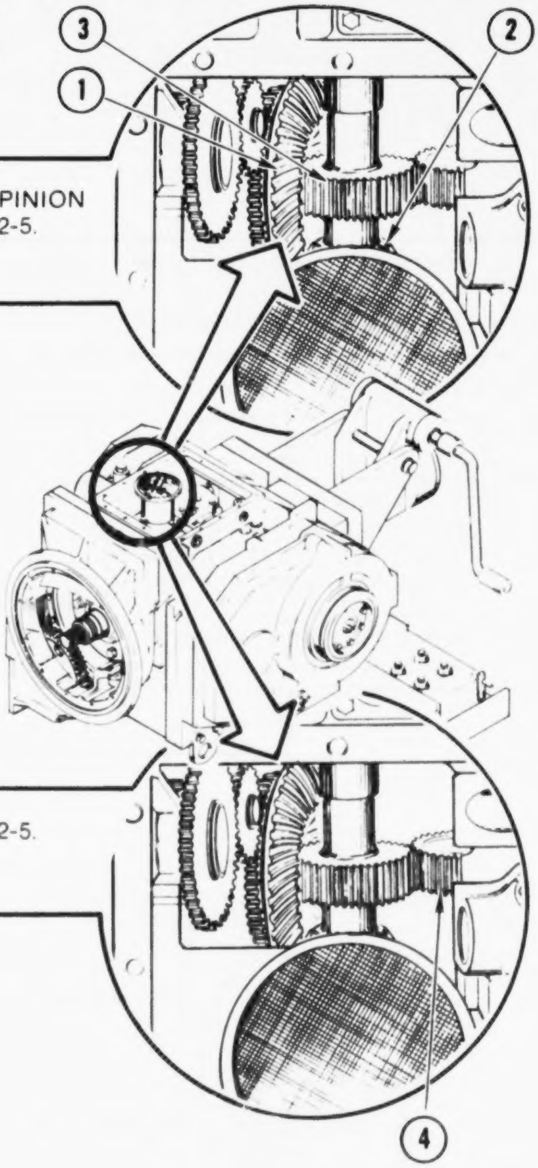
1. INSPECT INPUT IDLER SPUR GEAR (4). See page 2-5.
2. IS GEAR (4) DAMAGED?

YES

Corrective action:

1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

NO



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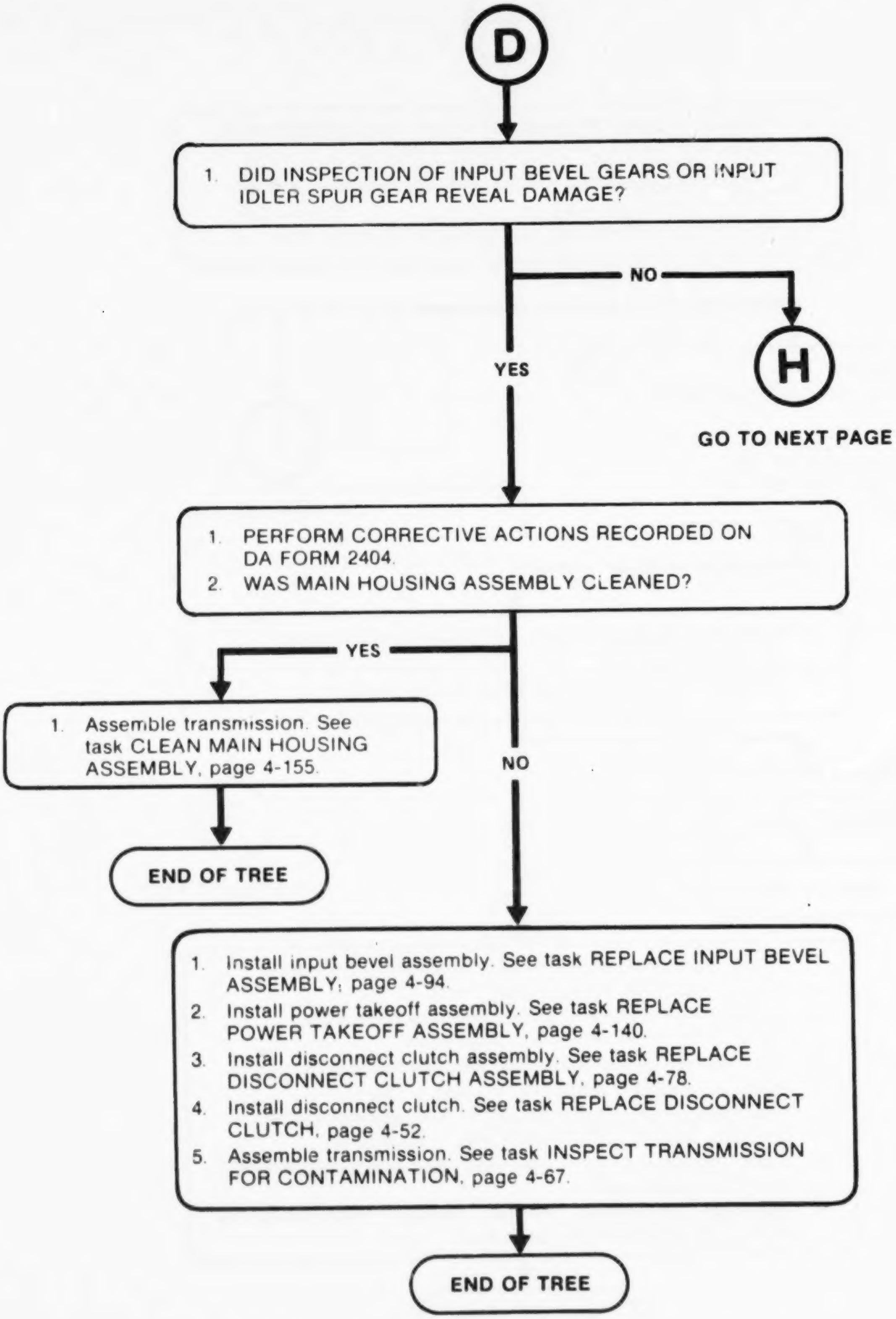
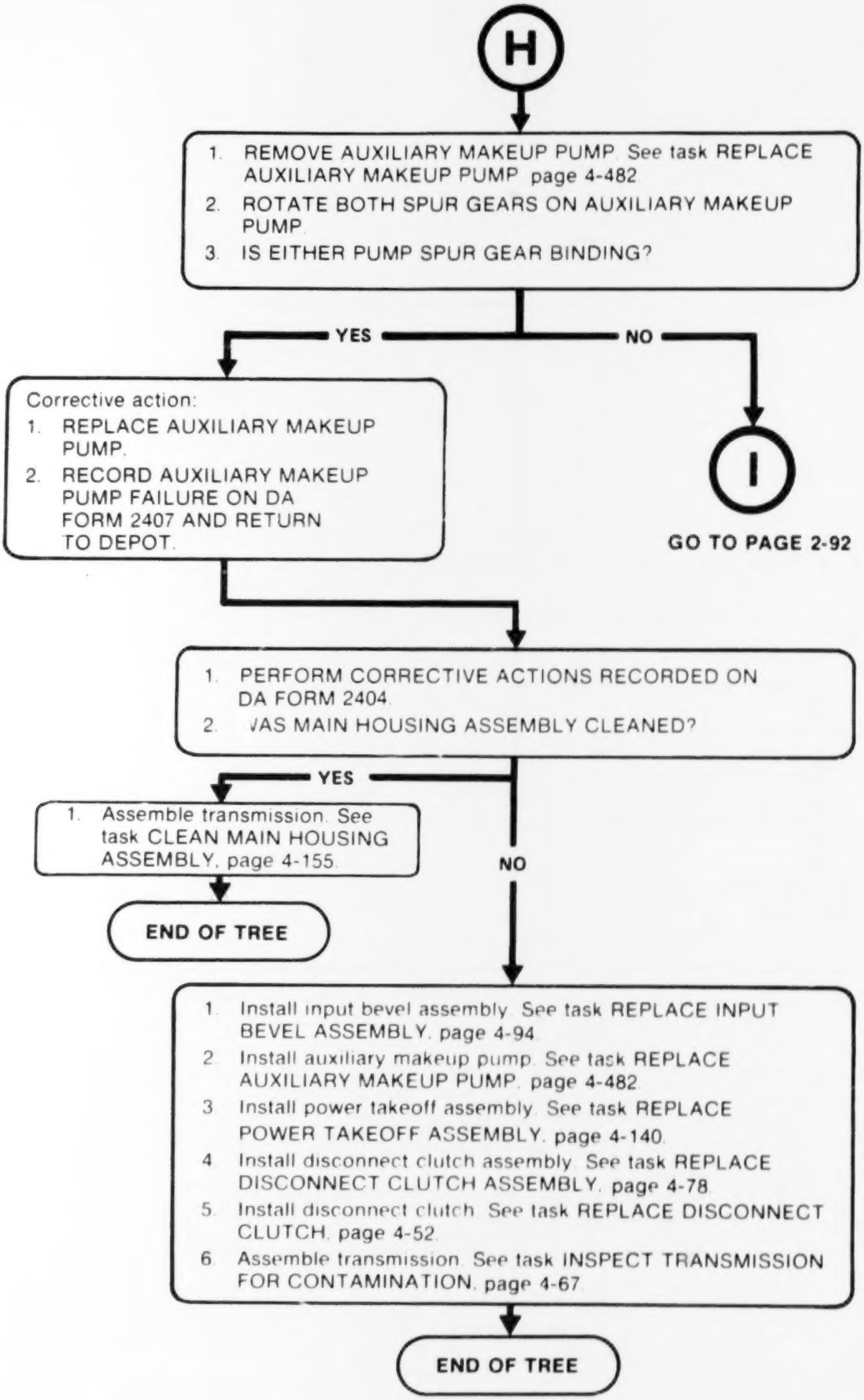


1. DID INSPECTION OF INPUT BEVEL GEARS OR INPUT IDLER SPUR GEAR REVEAL DAMAGE?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
3. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
4. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
5. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP page 4-482
2. ROTATE BOTH SPUR GEARS ON AUXILIARY MAKEUP PUMP.
3. IS EITHER PUMP SPUR GEAR BINDING?

Corrective action:
1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN TO DEPOT.

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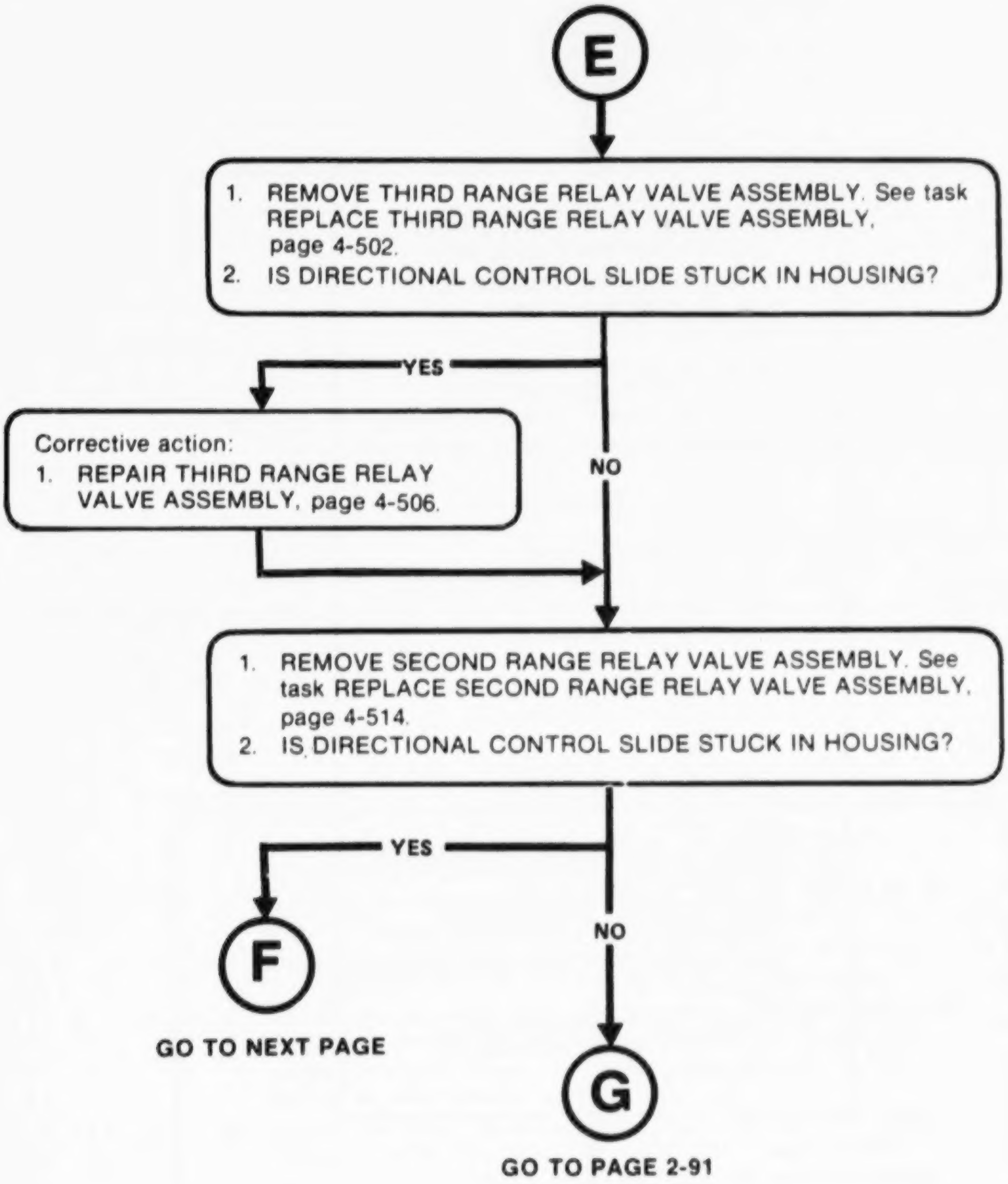
1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. VAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
3. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
4. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
5. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
6. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE


E
1. REMOVE THIRD RANGE RELAY VALVE ASSEMBLY. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?
YES
NO
Corrective action:
1. REPAIR THIRD RANGE RELAY VALVE ASSEMBLY, page 4-506.
1. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?
YES
NO
F
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F

Corrective action:

1. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
2. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY. See page 2-2.
3. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
5. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY. See page 2-2.
6. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
7. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
8. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
9. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
10. CLEAN HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See page 2-2.

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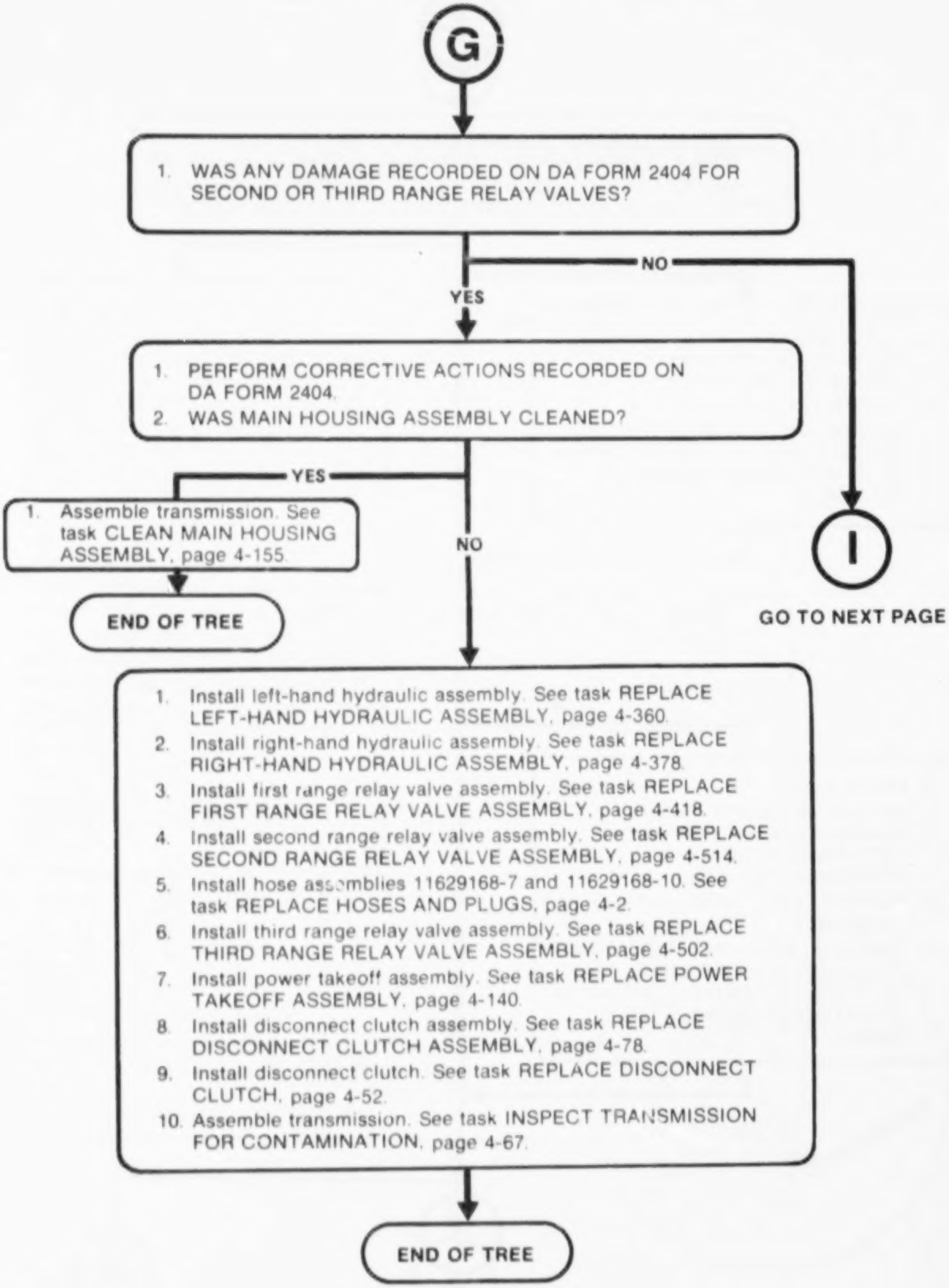
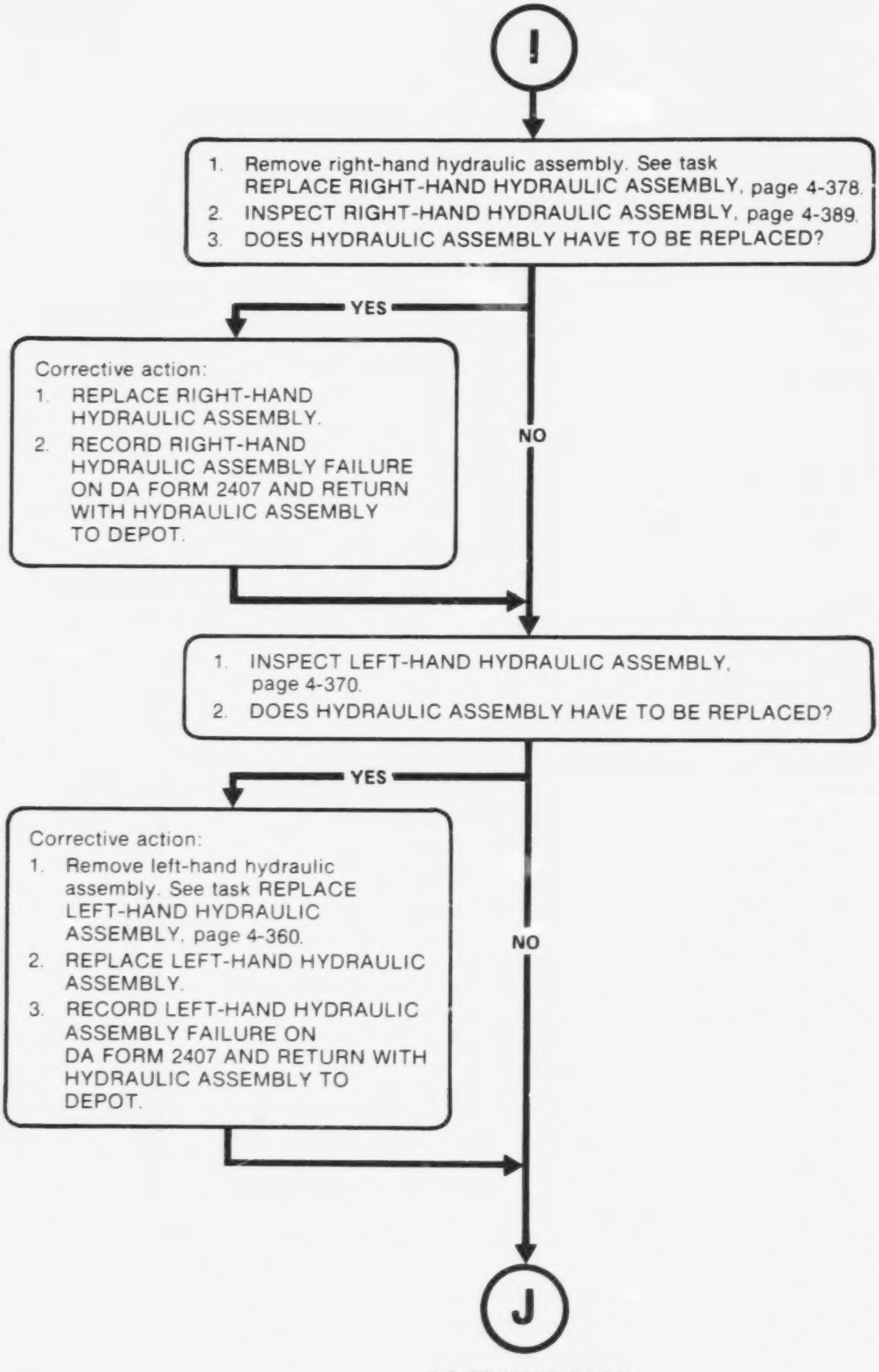


1. WAS ANY DAMAGE RECORDED ON DA FORM 2404 FOR SECOND OR THIRD RANGE RELAY VALVES?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
7. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
8. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
9. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD RIGHT-HAND HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

1. Remove left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD LEFT-HAND HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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J

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

YES

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY. See page 2-2.
4. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
6. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY. See page 2-2.
7. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
8. CLEAN HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See page 2-2.

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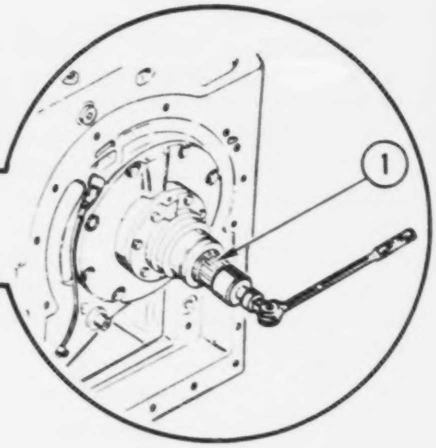
NO

1. USING DRAG WRENCH, ROTATE INPUT BEVEL SHAFT (1).
2. IS SHAFT (1) FROZEN OR BINDING?



YES

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NO

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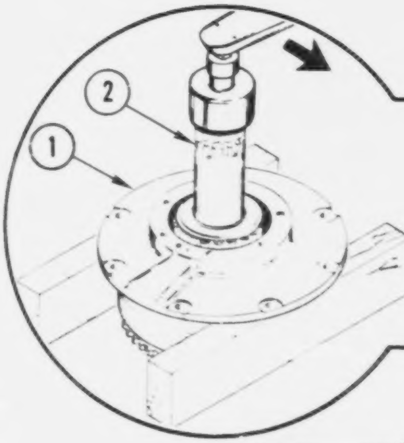


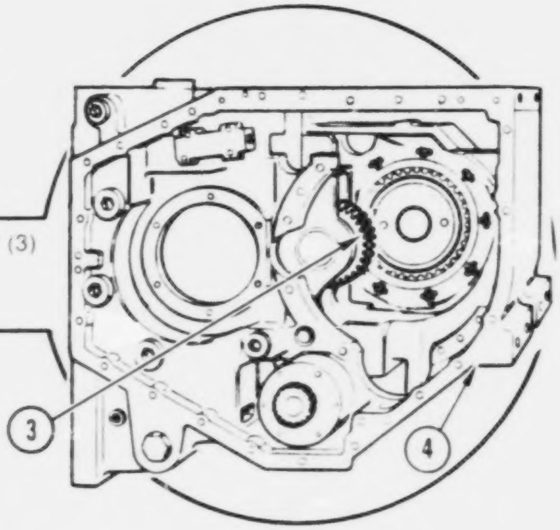
1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. PLACE INPUT BEVEL ASSEMBLY (1) ON WOOD BLOCKS.
3. USING TORQUE WRENCH WITH ADAPTER AND DRAG WRENCH, TURN SHAFT (2) ONE FULL TURN. HAVE HELPER ASSIST.
4. IS TURNING TORQUE MORE THAN 20 IN-LB (17-23 cmkg)?

YES

Corrective action:
1. REPAIR INPUT BEVEL ASSEMBLY. See page 4-126.

NO

1. INSPECT INPUT IDLER SPUR GEAR ASSEMBLY (3) IN HOUSING (4) FOR DAMAGE. See page 2-5.
2. IS IDLER SPUR GEAR ASSEMBLY DAMAGED?



YES

Corrective action:
1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY. See page 4-45.

NO

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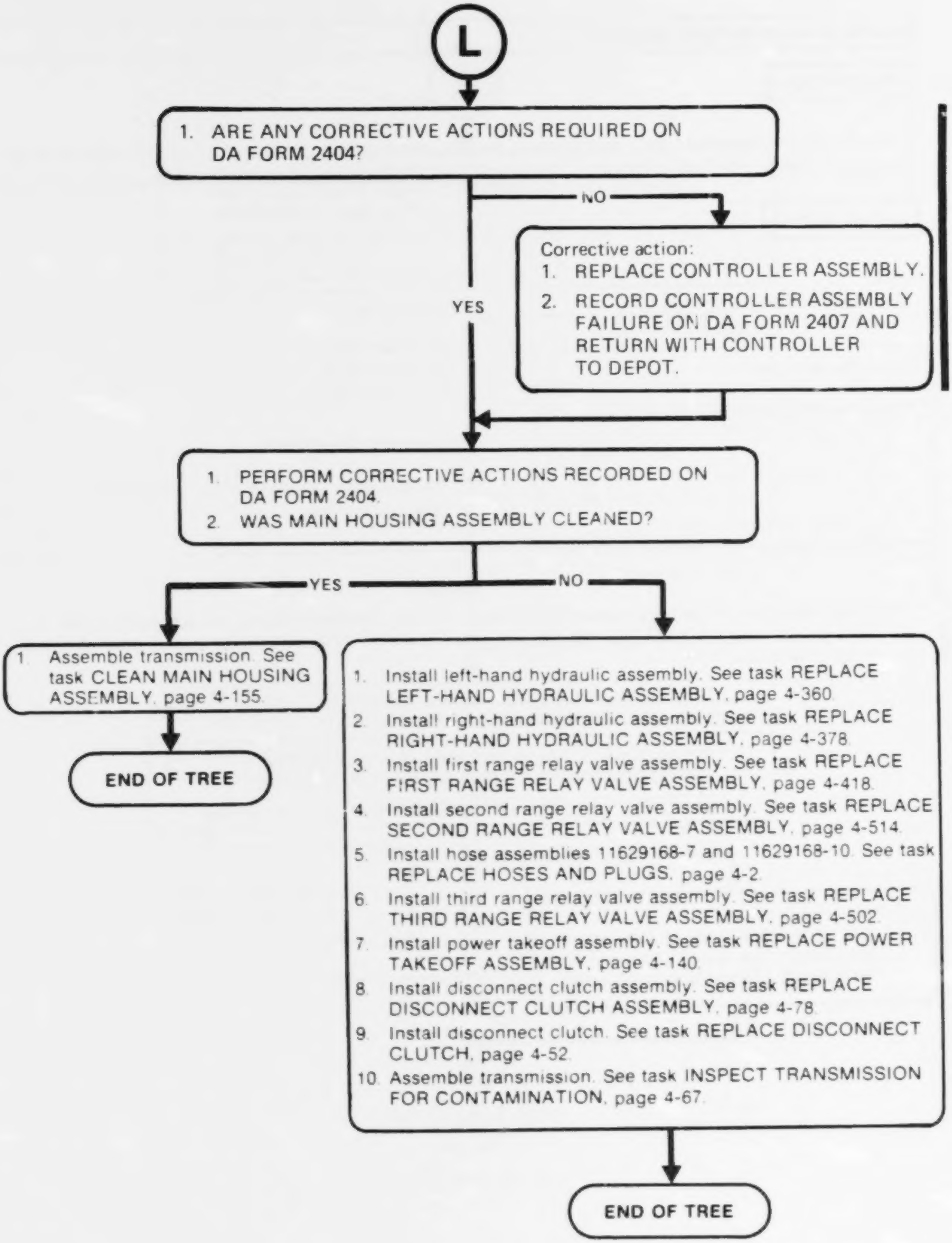


1. ARE ANY CORRECTIVE ACTIONS REQUIRED ON DA FORM 2404?

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
7. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
8. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
9. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

ENGINE STALLS DURING BRAKING

DESCRIPTION

This tree covers inspection for a fault causing engine stall during braking and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

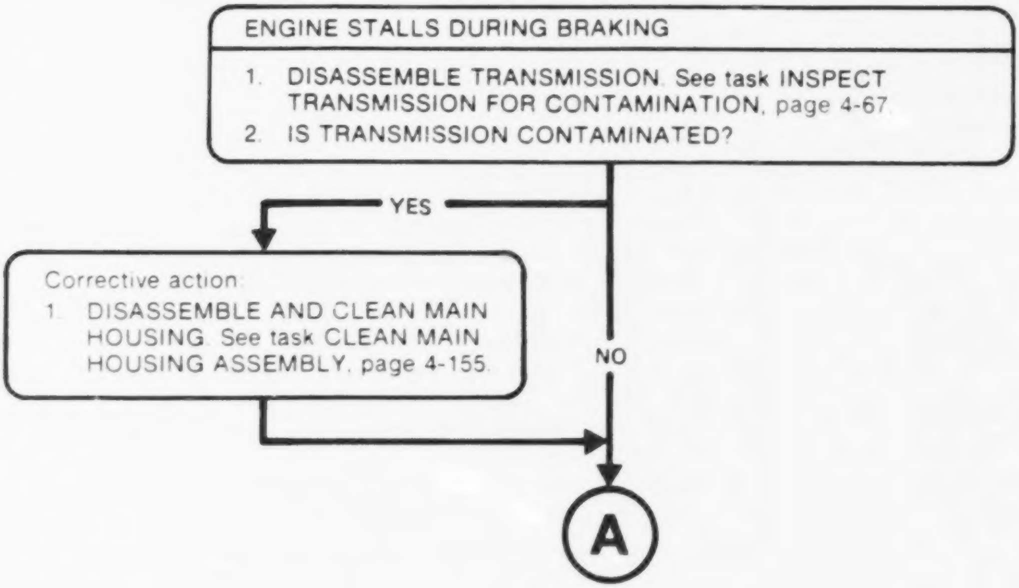
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



ENGINE STALLS DURING BRAKING

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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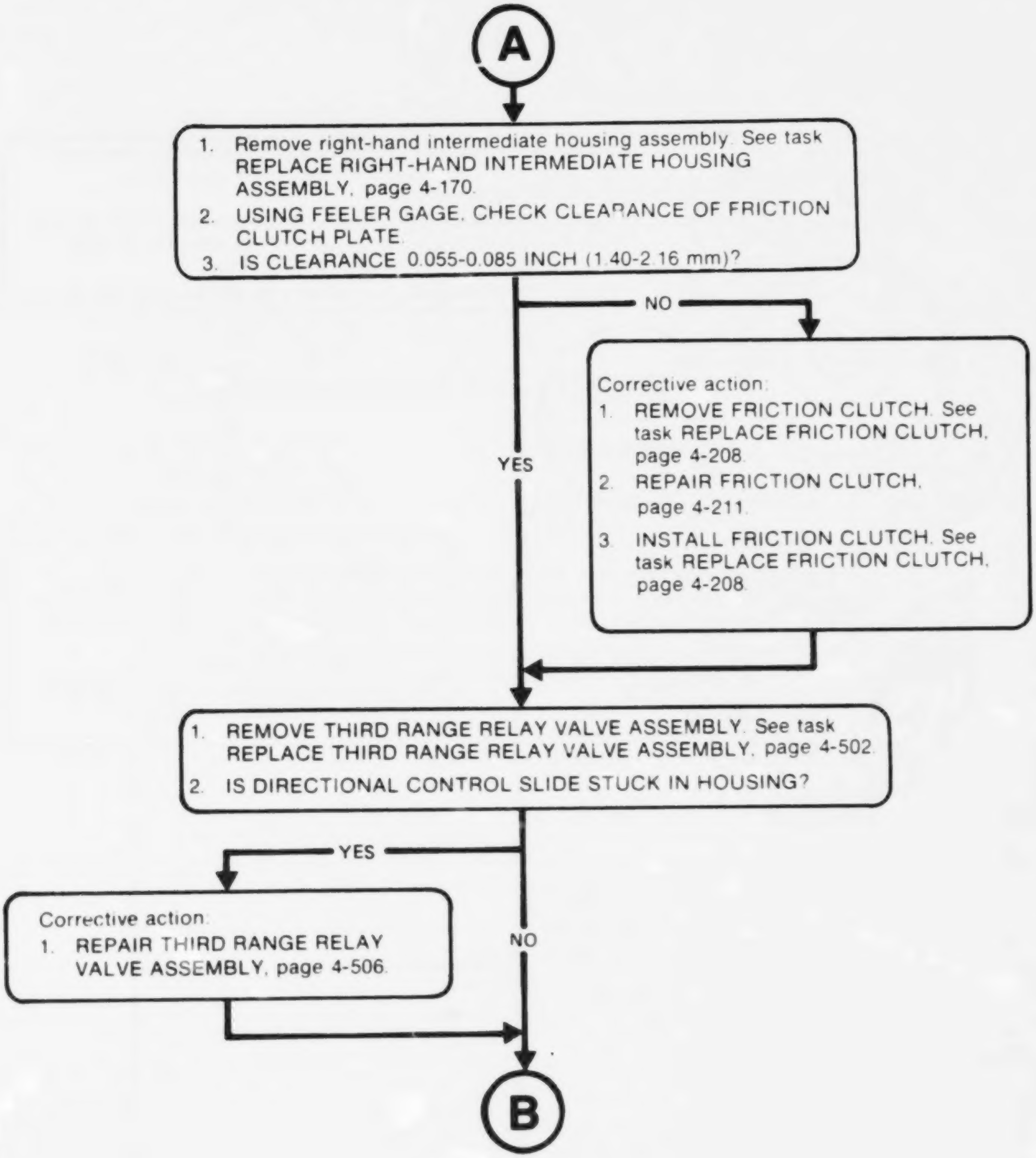

1. Remove right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. USING FEELER GAGE, CHECK CLEARANCE OF FRICTION CLUTCH PLATE.
3. IS CLEARANCE 0.055-0.085 INCH (1.40-2.16 mm)?

Corrective action:
1. REMOVE FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.
2. REPAIR FRICTION CLUTCH, page 4-211.
3. INSTALL FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.

1. REMOVE THIRD RANGE RELAY VALVE ASSEMBLY. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:
1. REPAIR THIRD RANGE RELAY VALVE ASSEMBLY, page 4-506.

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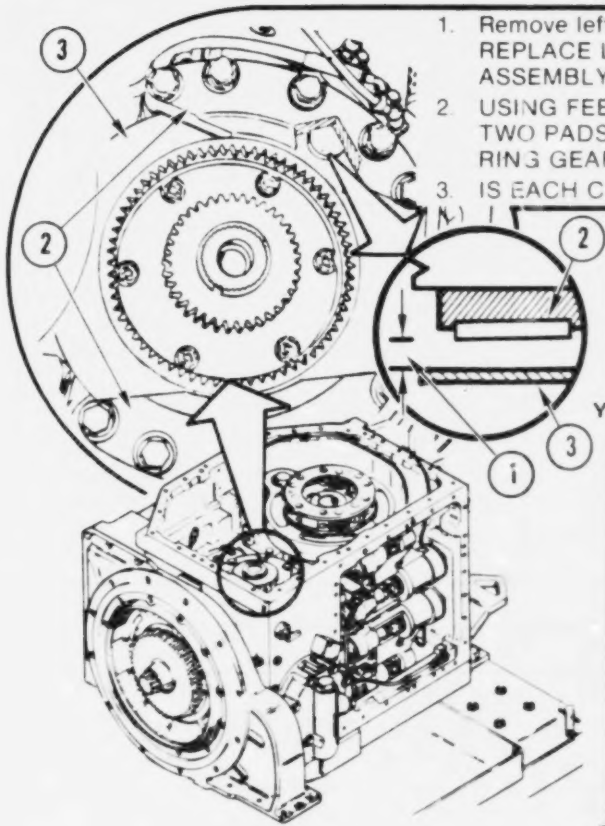
B

1. Remove left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. USING FEELER GAGE, CHECK CLEARANCE (1) BETWEEN TWO PADS ON EACH SECOND RANGE BRAKE (2) AND RING GEAR (3).
3. IS EACH CLEARANCE (1) 0.021-0.060 INCH (0.53-1.52 mm)?



NO

Corrective action:

1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

YES

1. WAS THIRD RANGE DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

NO

YES

C

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D

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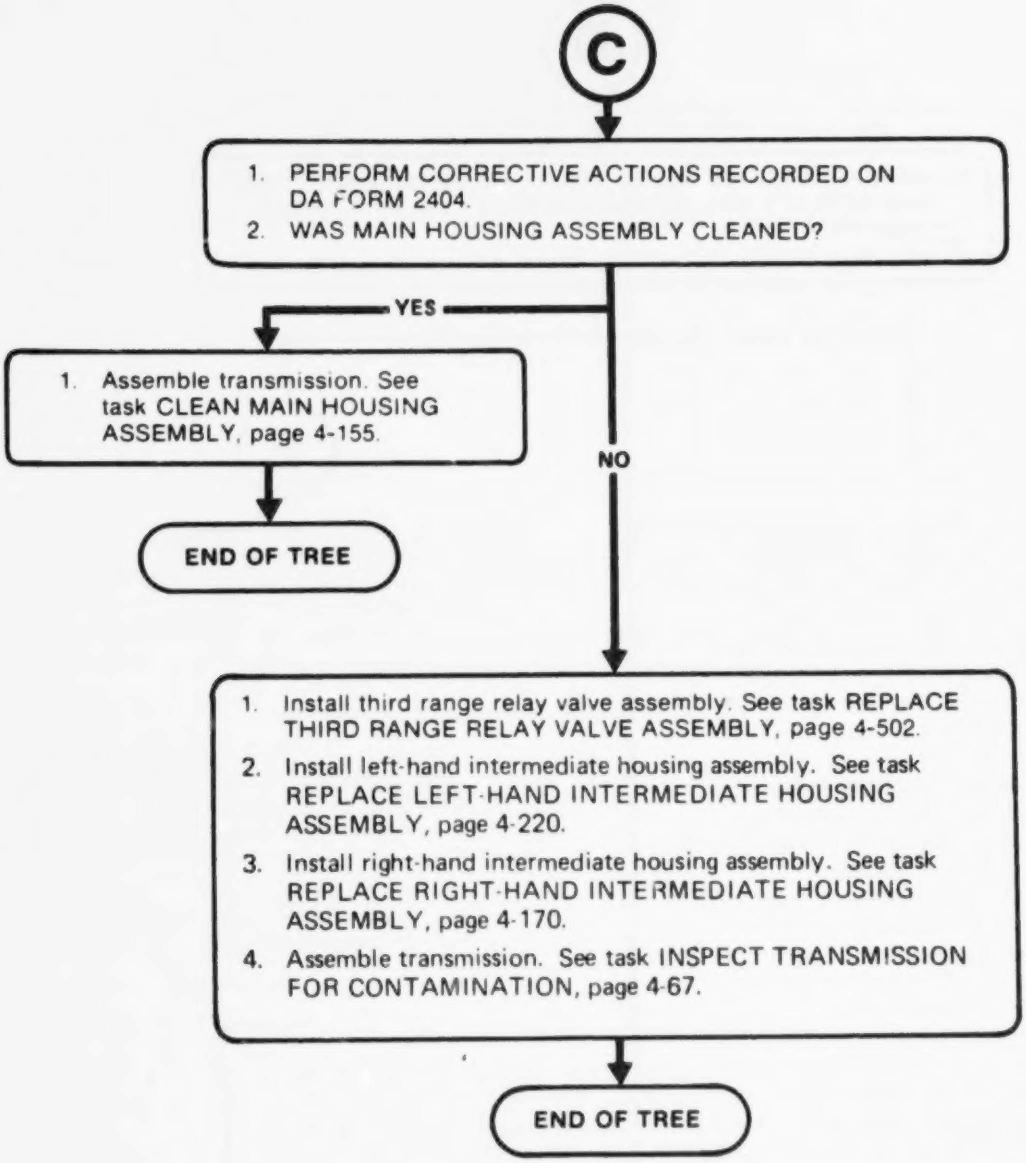


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

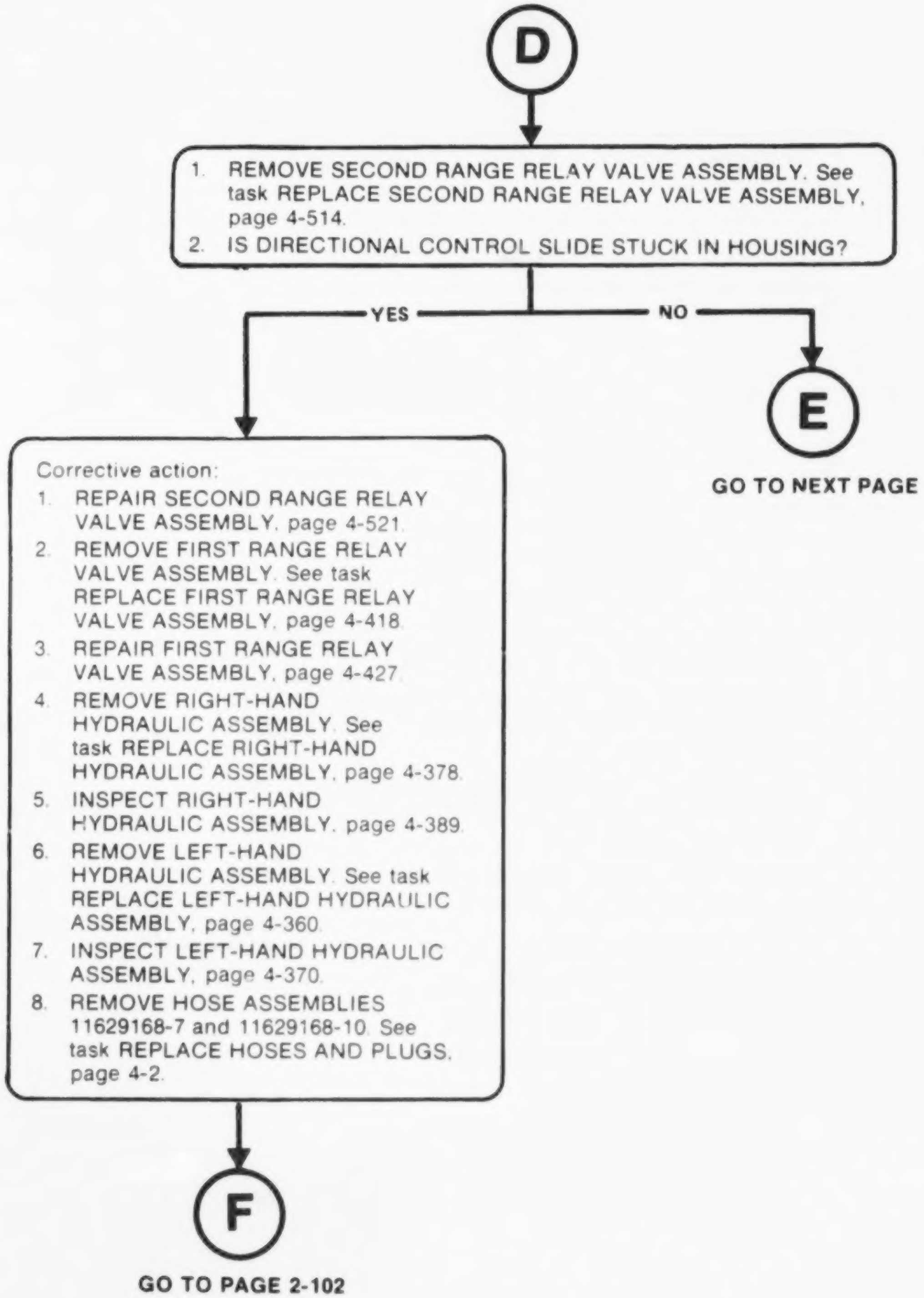
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
2. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
3. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
4. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
2. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
3. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
4. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
5. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
6. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
7. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
8. REMOVE HOSE ASSEMBLIES 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

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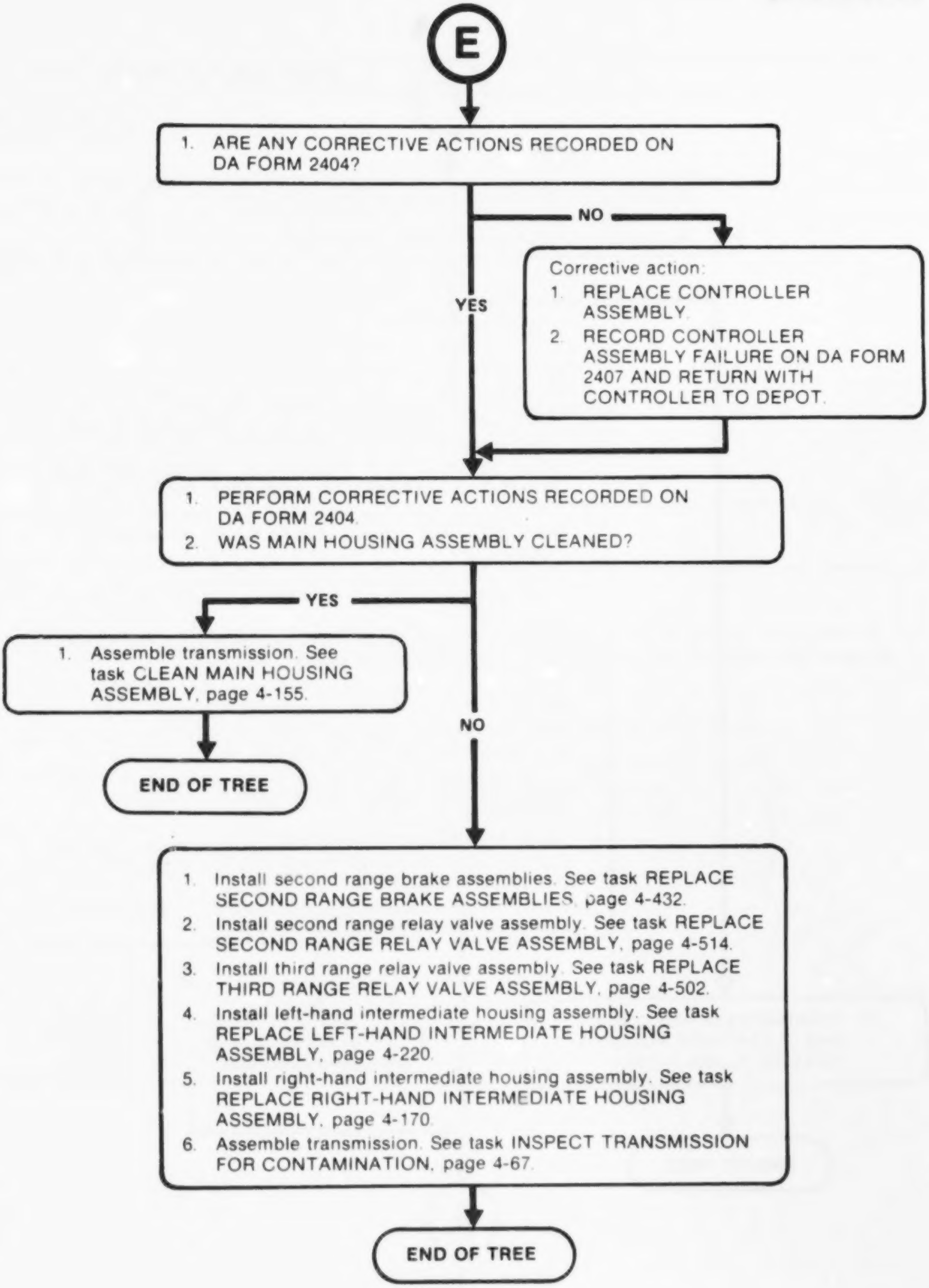


1. ARE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404?

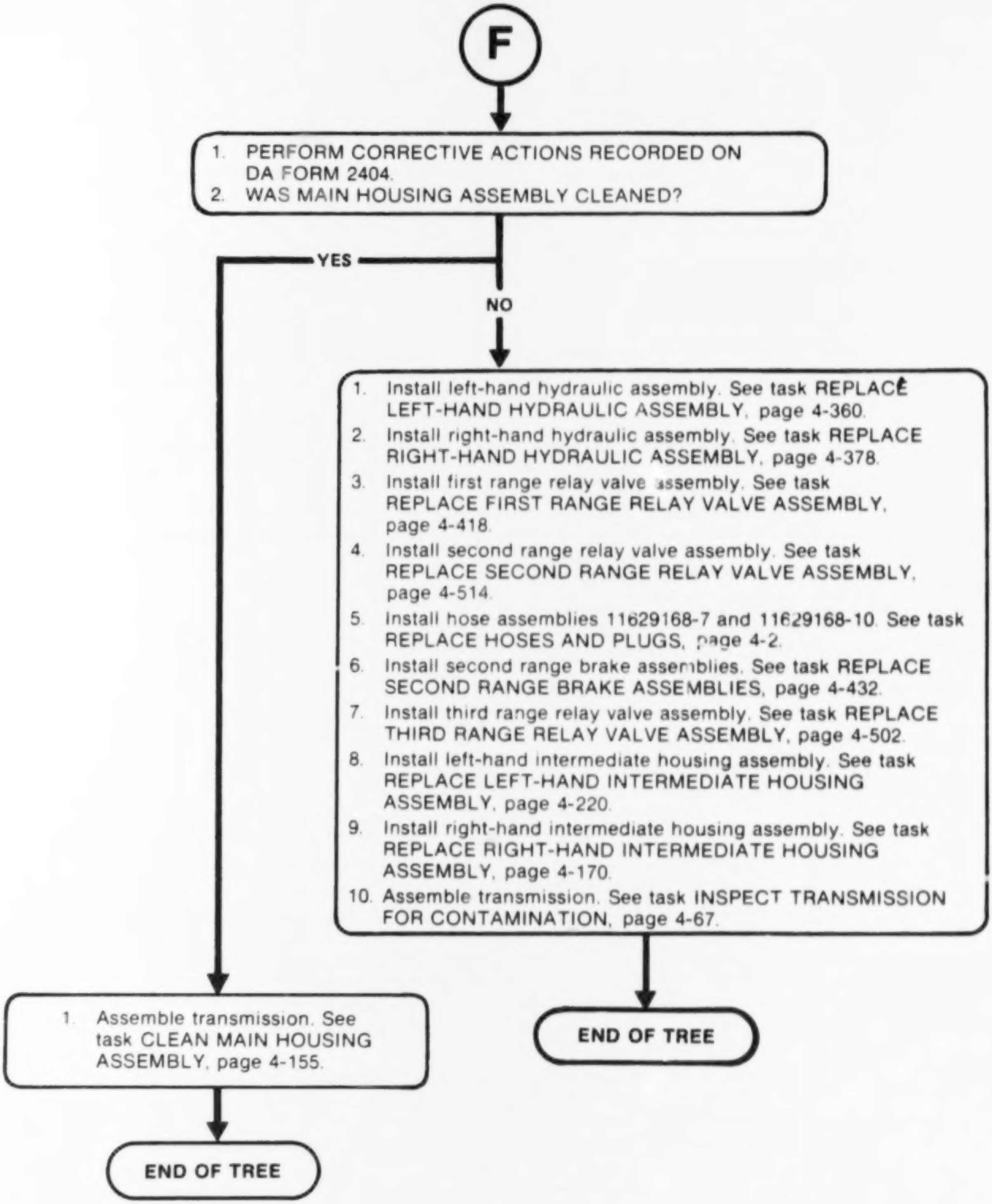
Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
3. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
4. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
5. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
6. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
7. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
8. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
9. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

NO ACCELERATION IN THIRD RANGE

DESCRIPTION

This tree covers inspection for a fault causing no acceleration in third range and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10

References:

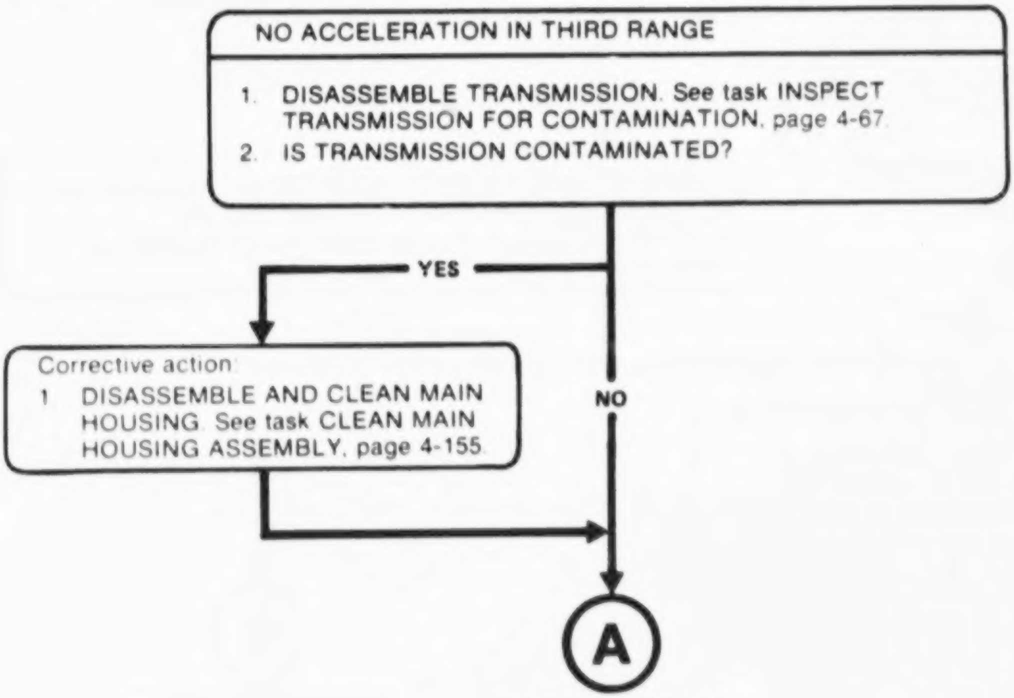
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



NO ACCELERATION IN THIRD RANGE

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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A

1. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. IS FRICTION CLUTCH PLATE CLEARANCE 0.055-0.085 INCH (1.40-2.16 mm)?

NO

Corrective action:

1. REMOVE FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.
2. REPAIR FRICTION CLUTCH, page 4-211.
3. INSTALL FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.

B

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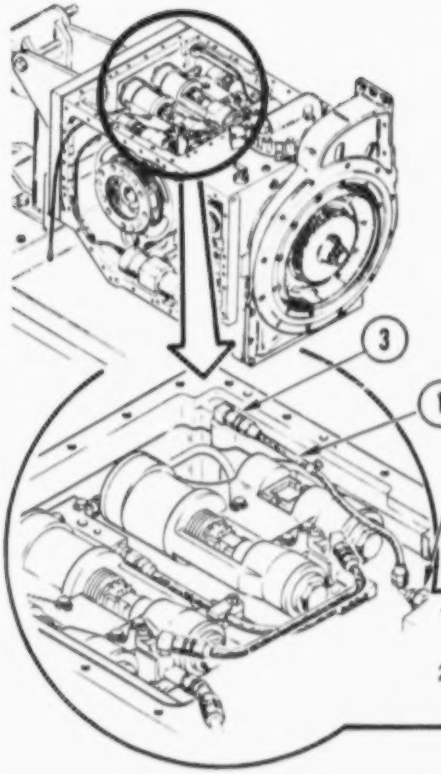
YES



1. INSPECT HOSE ASSEMBLY 11628453-7 (1), ADAPTER (2), AND HOSE TO BOSS ELBOW (3). See page 2-5.
2. IS HOSE ASSEMBLY (1), ADAPTER (2), OR ELBOW (3) DAMAGED?

YES

Corrective action:

1. REPLACE HOSE ASSEMBLY 11628453-7. See task REPLACE HOSES AND PLUGS, page 4-2.

D

GO TO NEXT PAGE

NO

C

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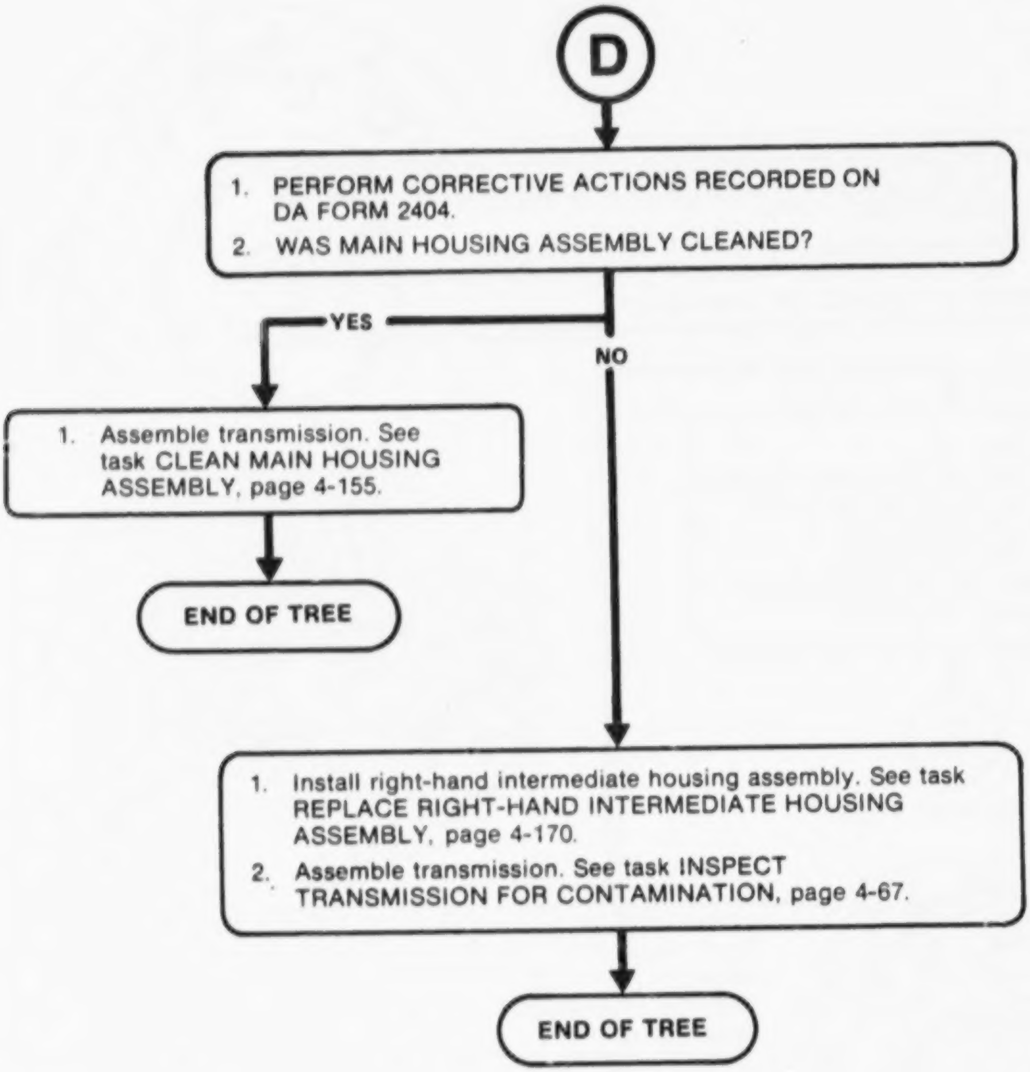


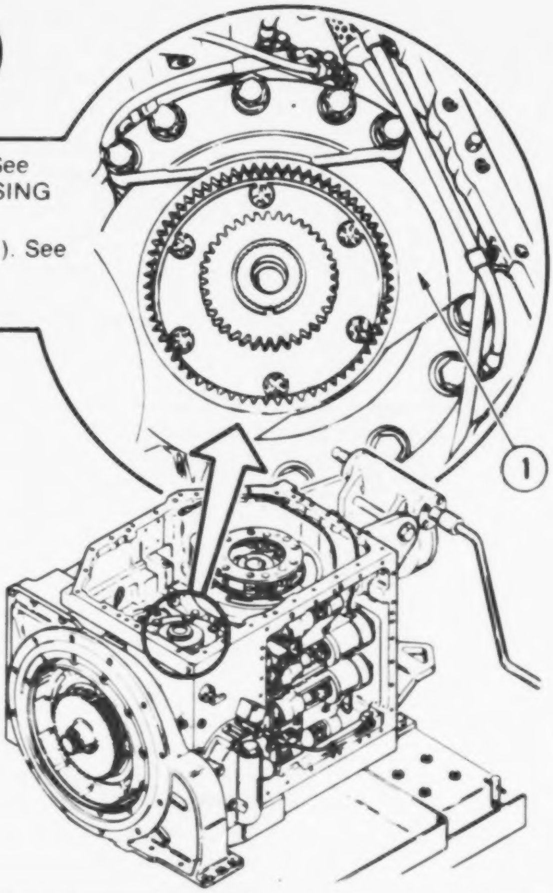
1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

B

1. Remove left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. INSPECT SECOND RANGE BRAKE RING GEAR (1). See page 2-5.
3. IS RING GEAR (1) SCORED OR DAMAGED?



YES

Corrective action:
1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

E

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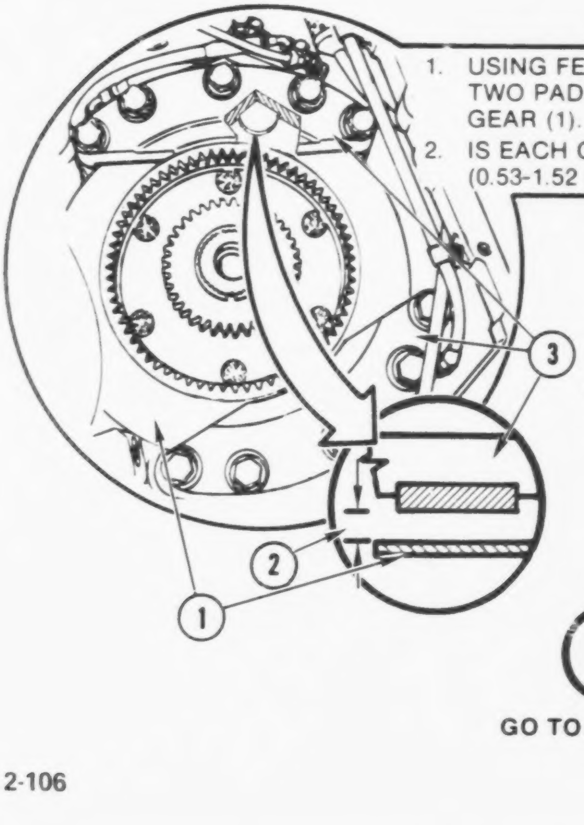
NO

1. USING FEELER GAGE, CHECK CLEARANCE (2) BETWEEN TWO PADS ON EACH SECOND RANGE BRAKE (3) AND RING GEAR (1).
2. IS EACH CLEARANCE (2) 0.021-0.060 INCH (0.53-1.52 mm)?



NO

Corrective action:
1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

YES

E

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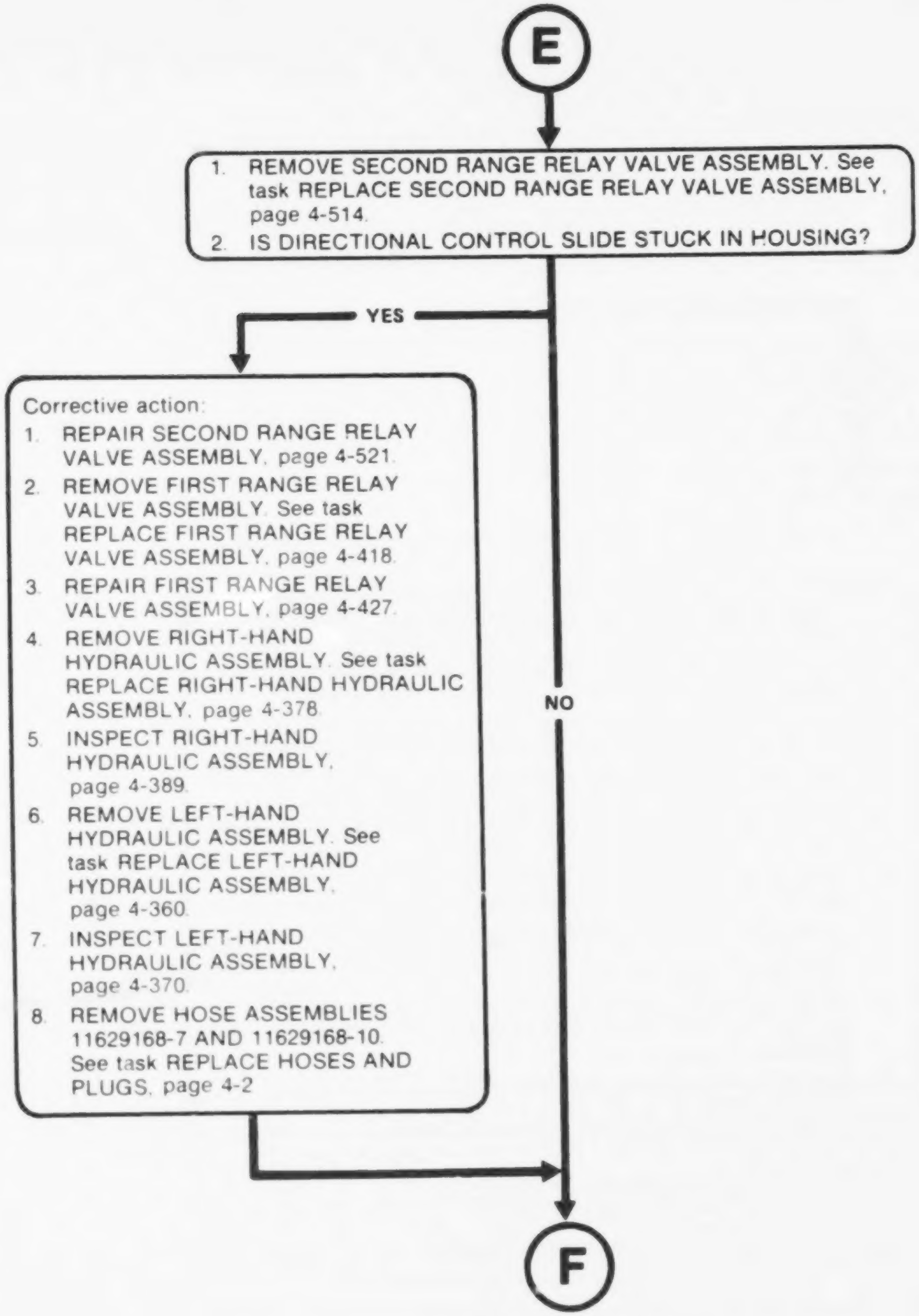

1. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
2. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
3. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
4. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
5. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
6. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
7. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
8. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2

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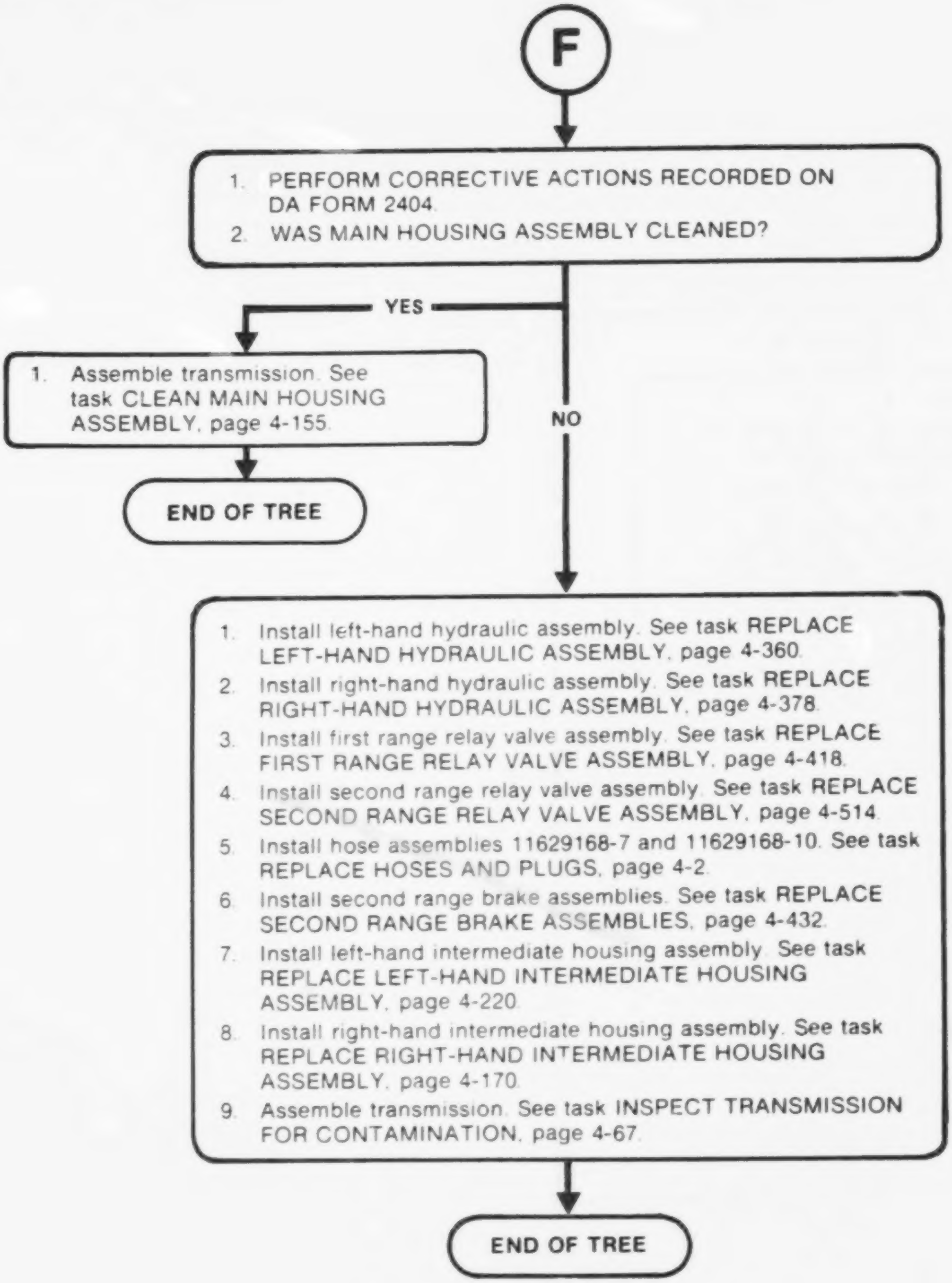
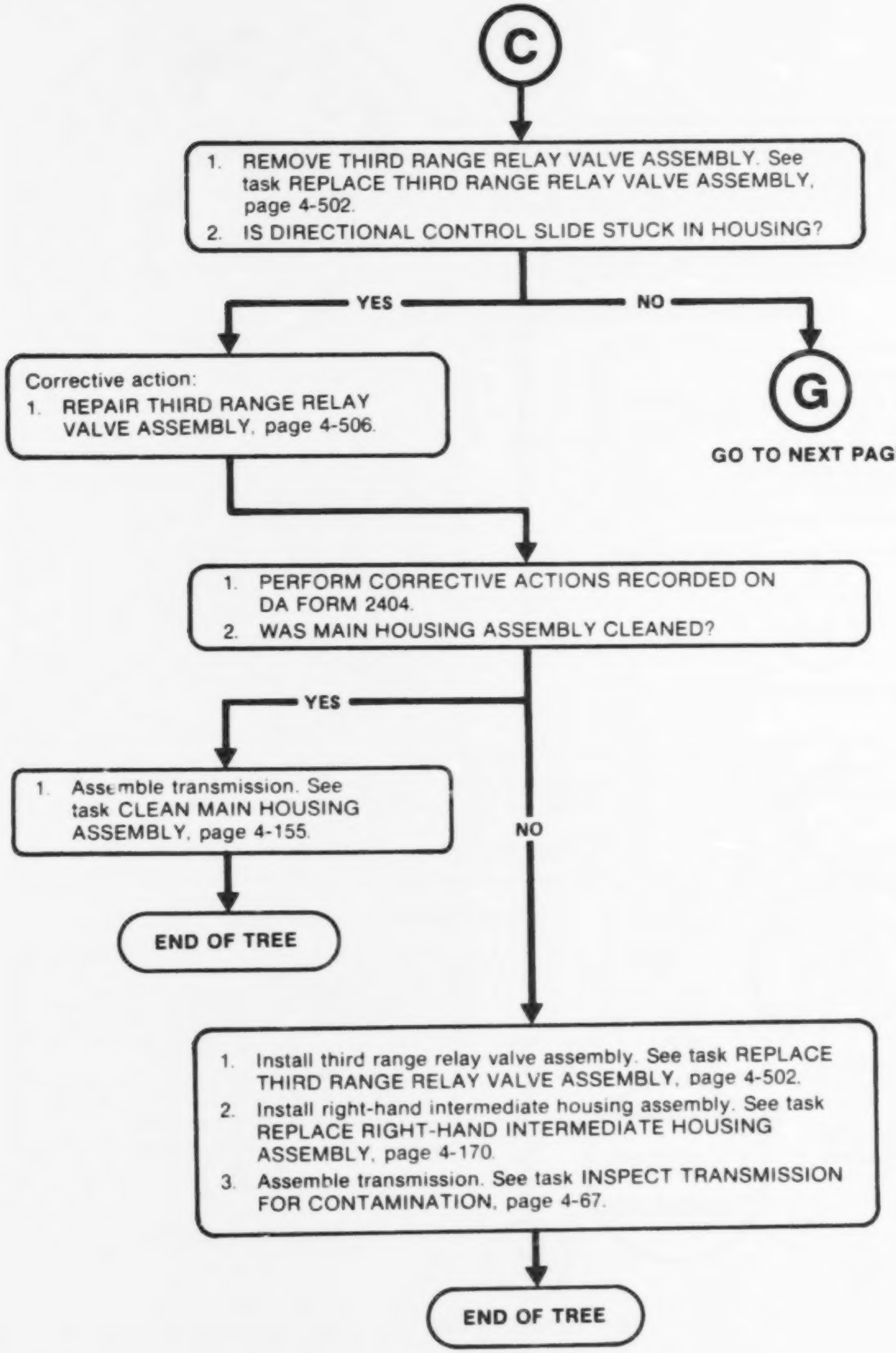


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
7. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
8. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. REMOVE THIRD RANGE RELAY VALVE ASSEMBLY. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:
1. REPAIR THIRD RANGE RELAY VALVE ASSEMBLY, page 4-506.

GO TO NEXT PAGE

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

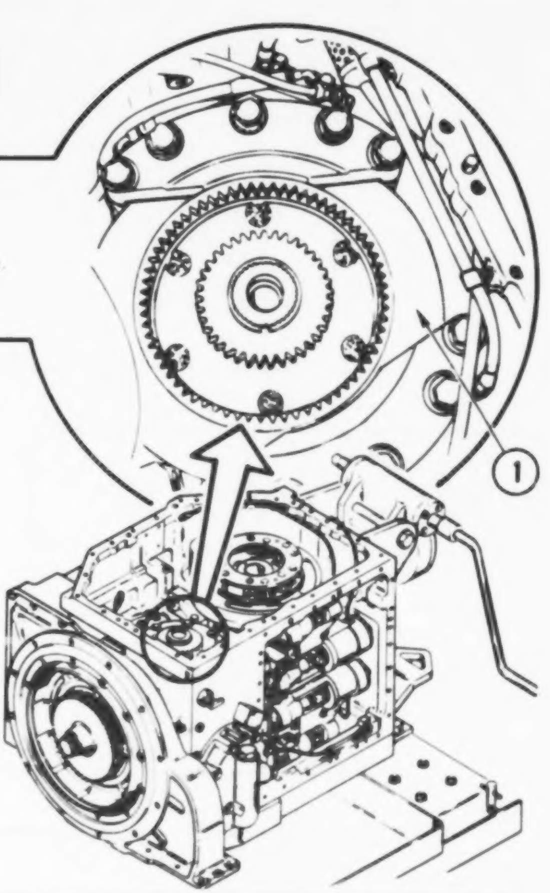
END OF TREE

1. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
2. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
3. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

G

1. Remove left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. INSPECT SECOND RANGE BRAKE RING GEAR (1). See page 2-5.
3. IS RING GEAR (1) SCORED OR DAMAGED?



YES

Corrective action:

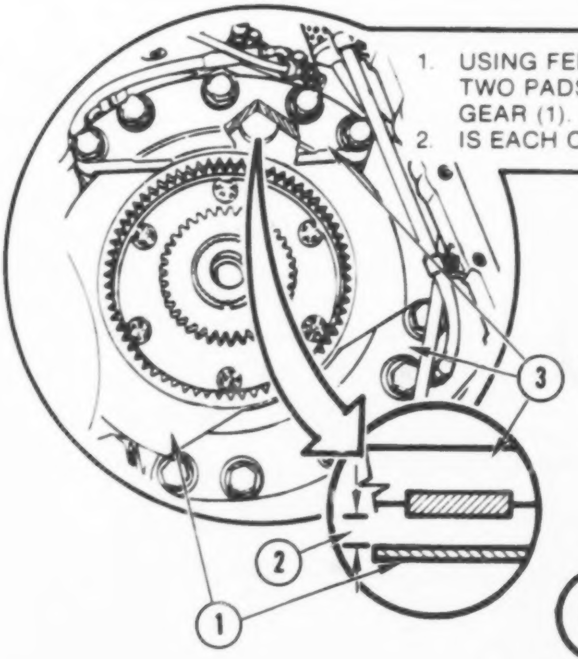
1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

H

GO TO NEXT PAGE

NO

1. USING FEELER GAGE, CHECK CLEARANCE (2) BETWEEN TWO PADS ON EACH SECOND RANGE BRAKE (3) AND RING GEAR (1).
2. IS EACH CLEARANCE (2) 0.021-0.060 INCH (0.53-1.52 mm)?



NO

Corrective action:

1. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
2. REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

YES

H

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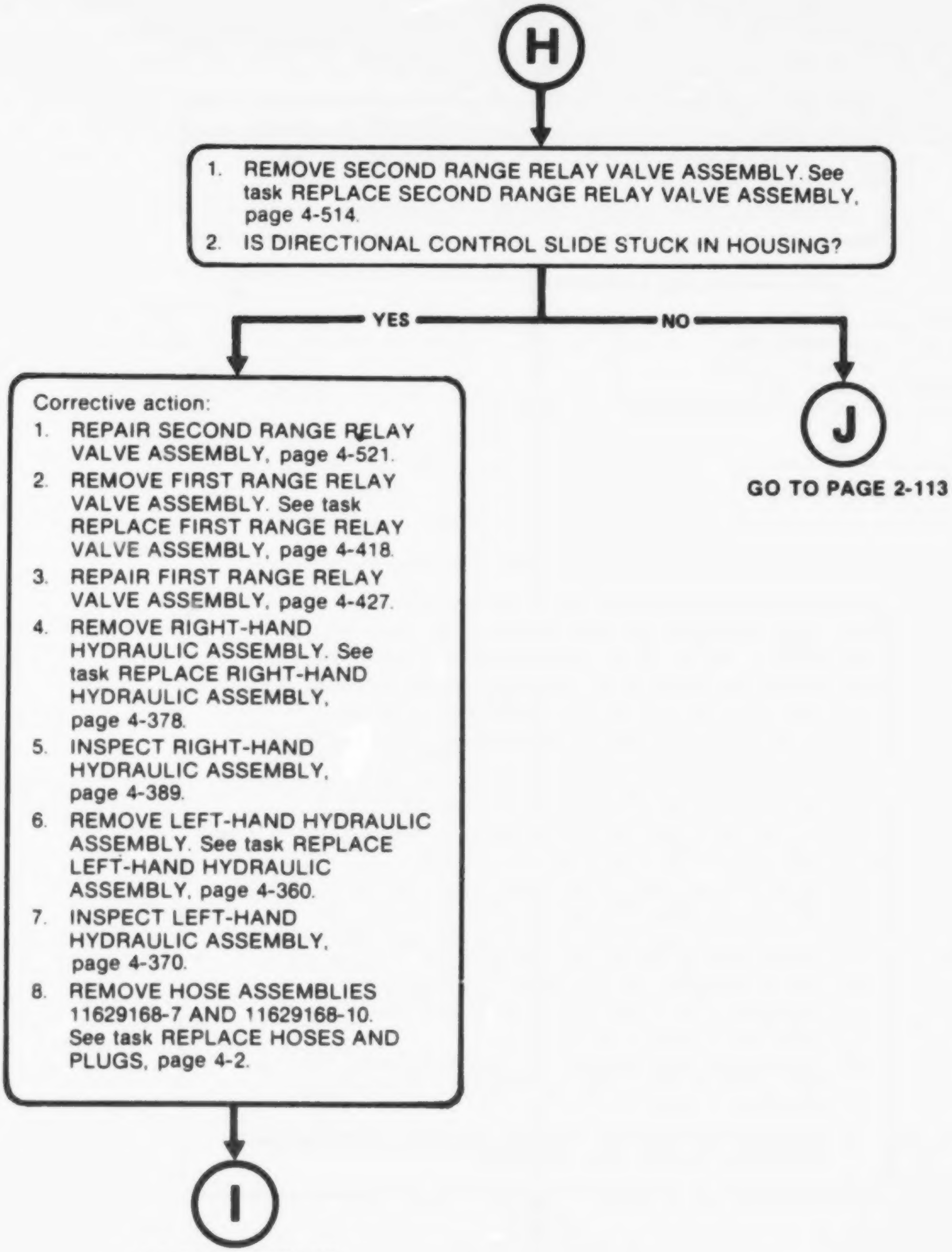

1. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
2. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
3. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
4. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
5. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
6. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
7. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
8. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

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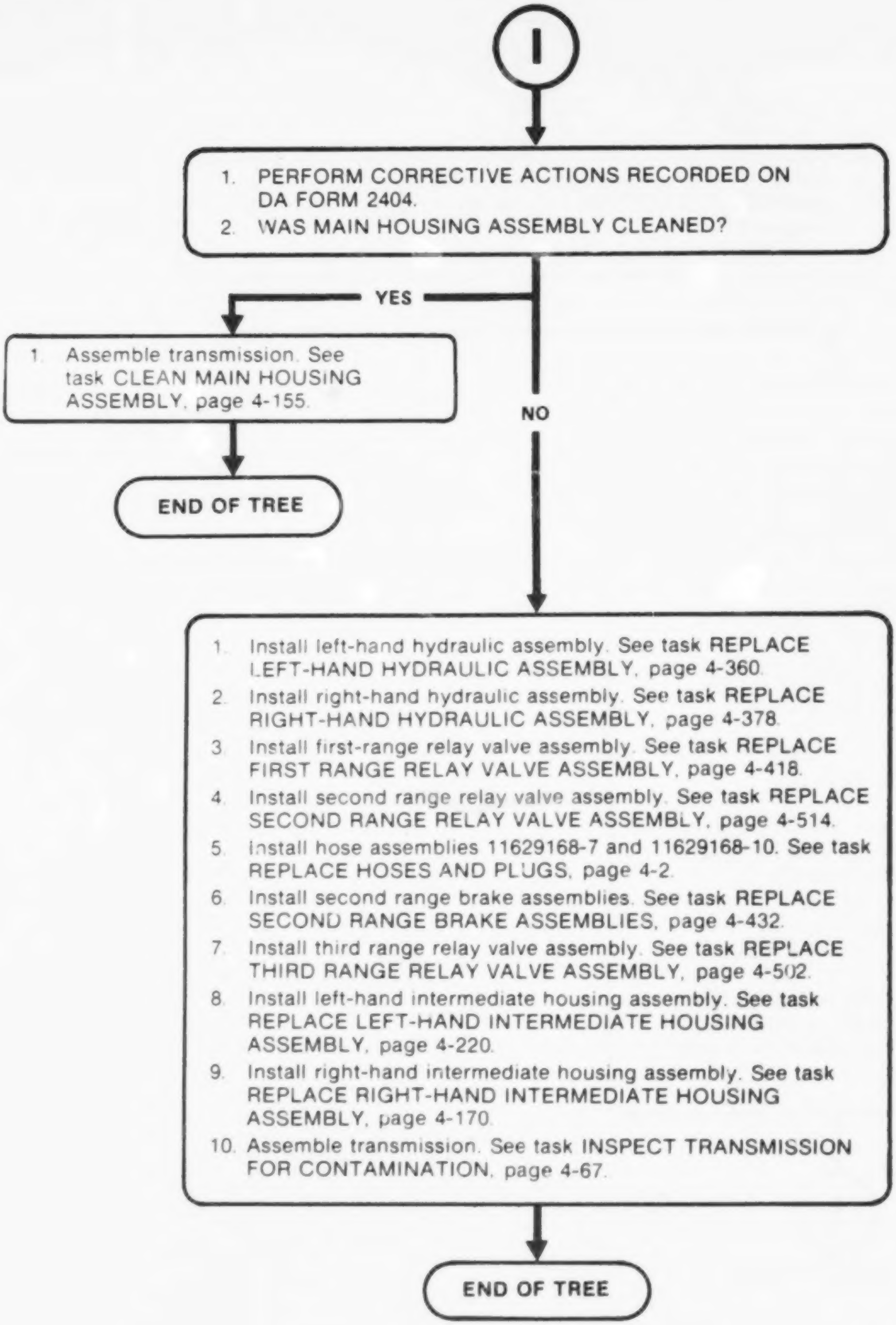
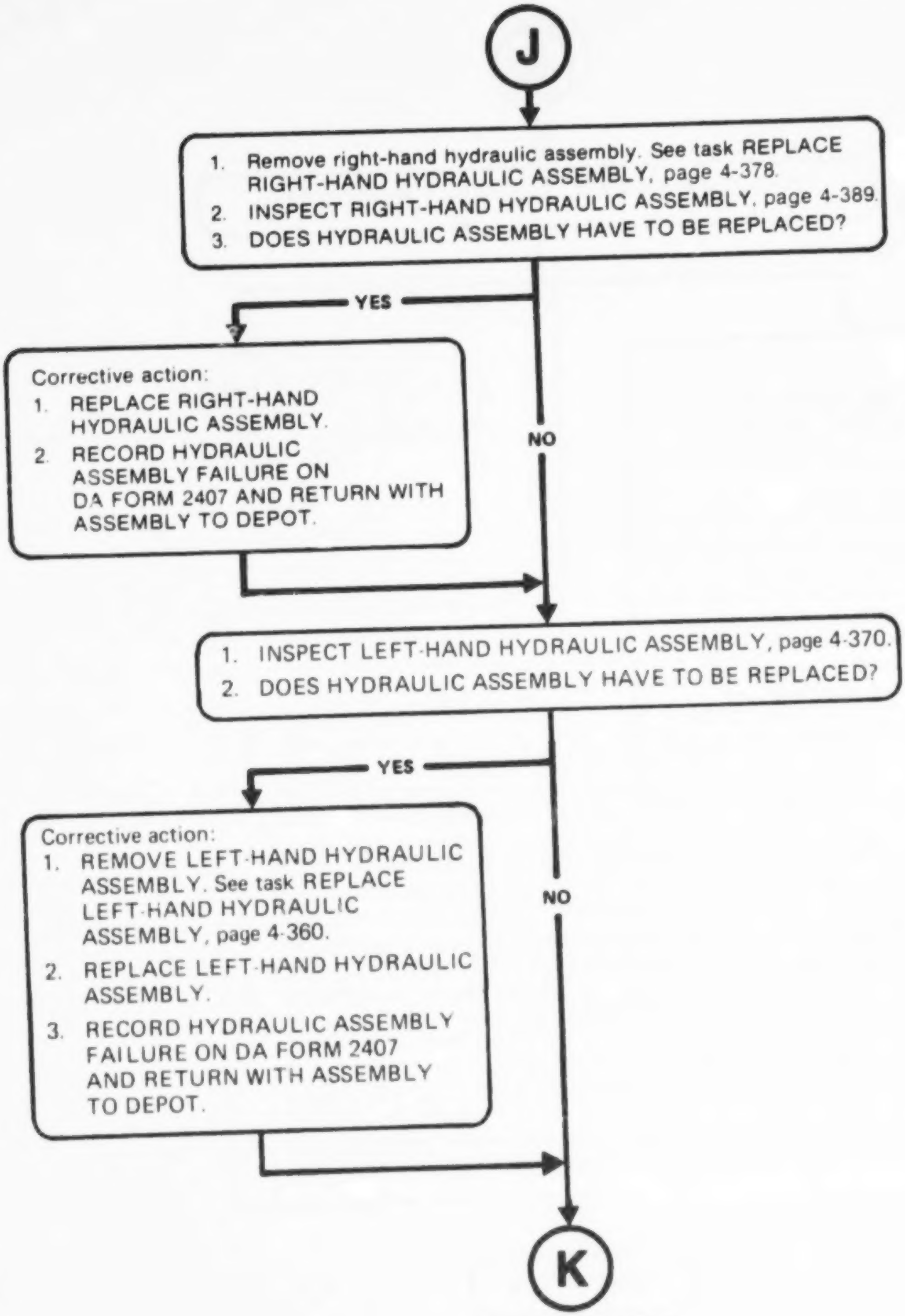


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first-range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
7. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
8. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
9. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

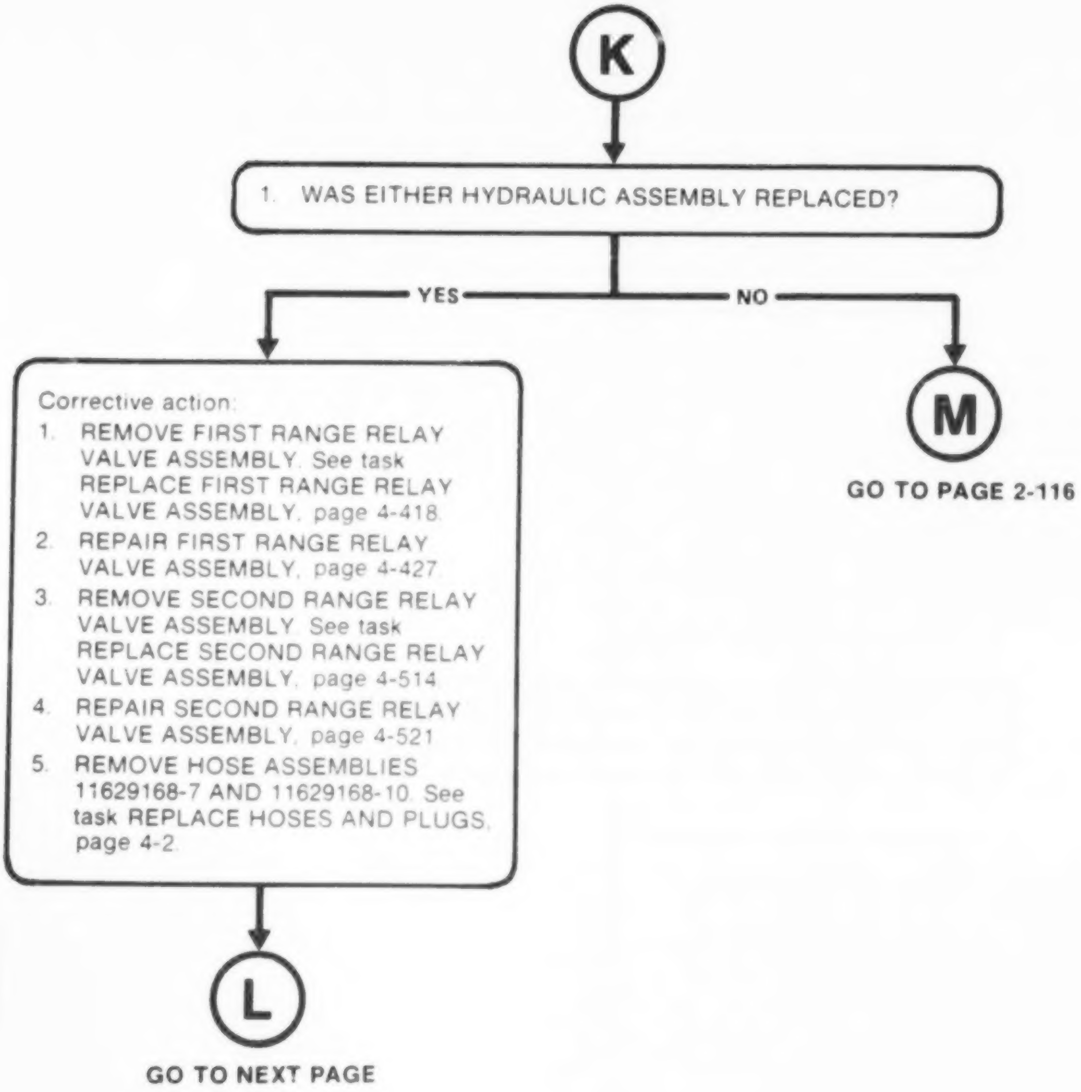
1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

1. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH ASSEMBLY TO DEPOT.

GO TO NEXT PAGE



1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

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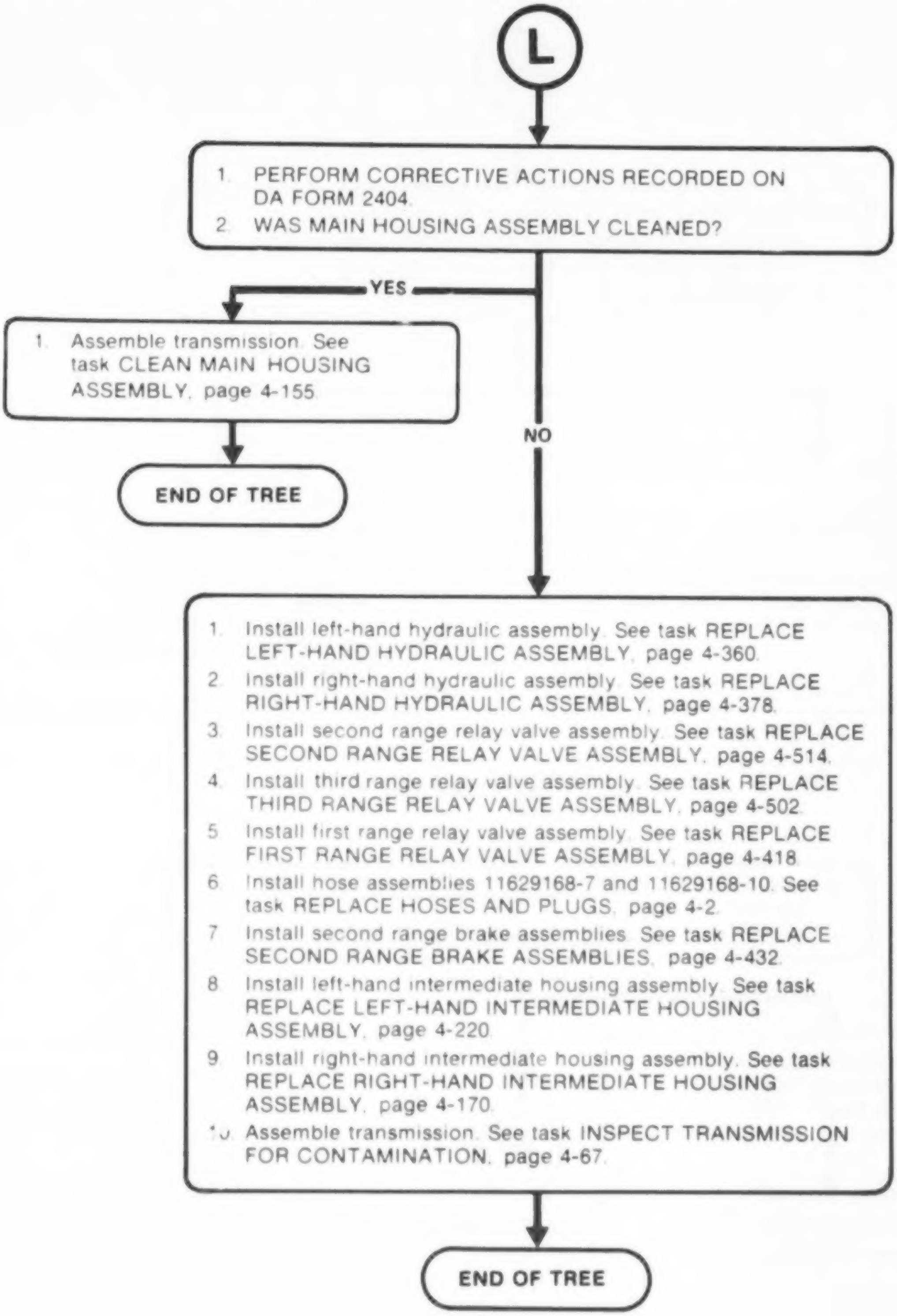
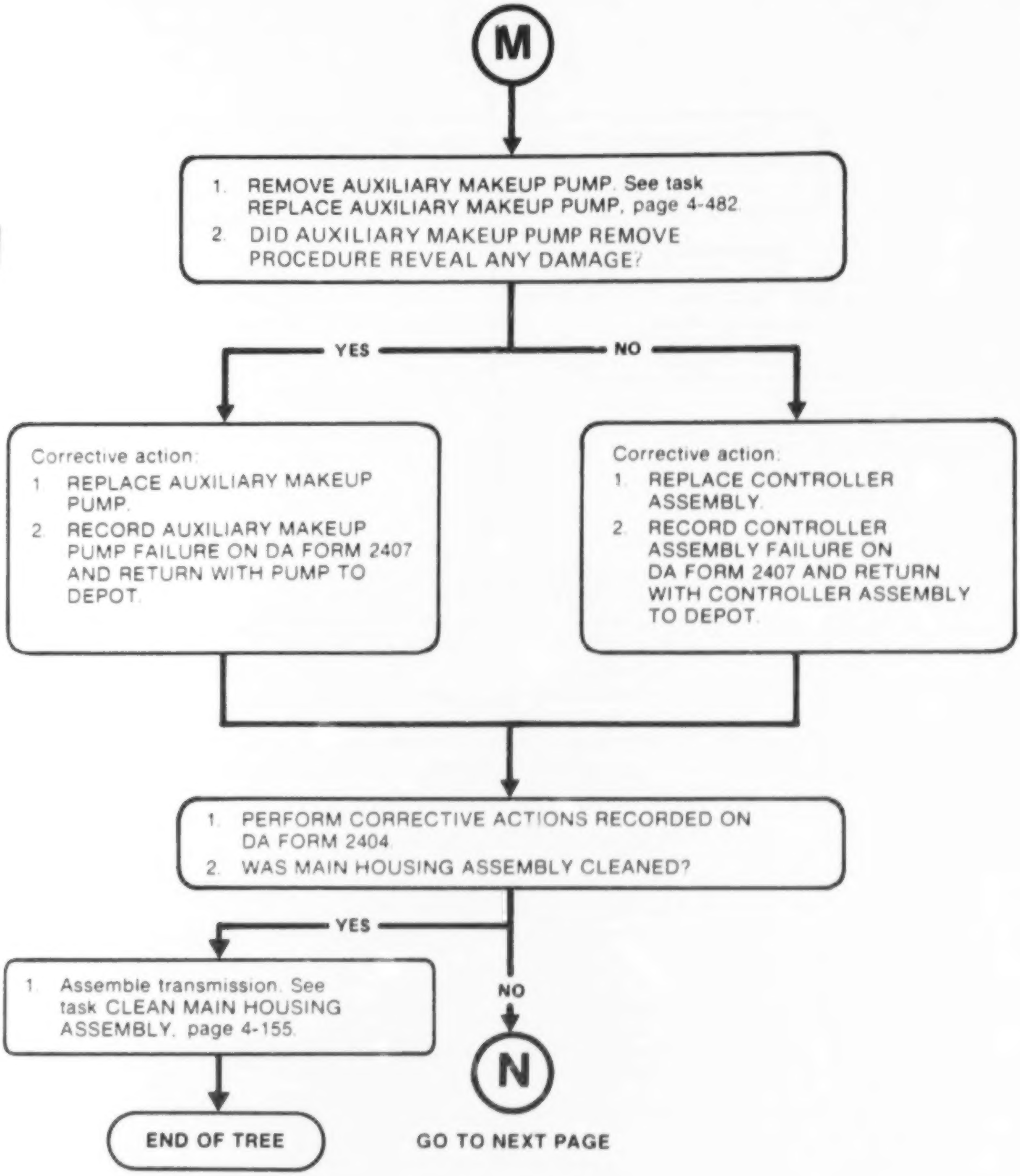


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
5. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
6. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
7. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
8. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
9. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
10. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
2. DID AUXILIARY MAKEUP PUMP REMOVE PROCEDURE REVEAL ANY DAMAGE?

Corrective action:

1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN WITH PUMP TO DEPOT.

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER ASSEMBLY TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

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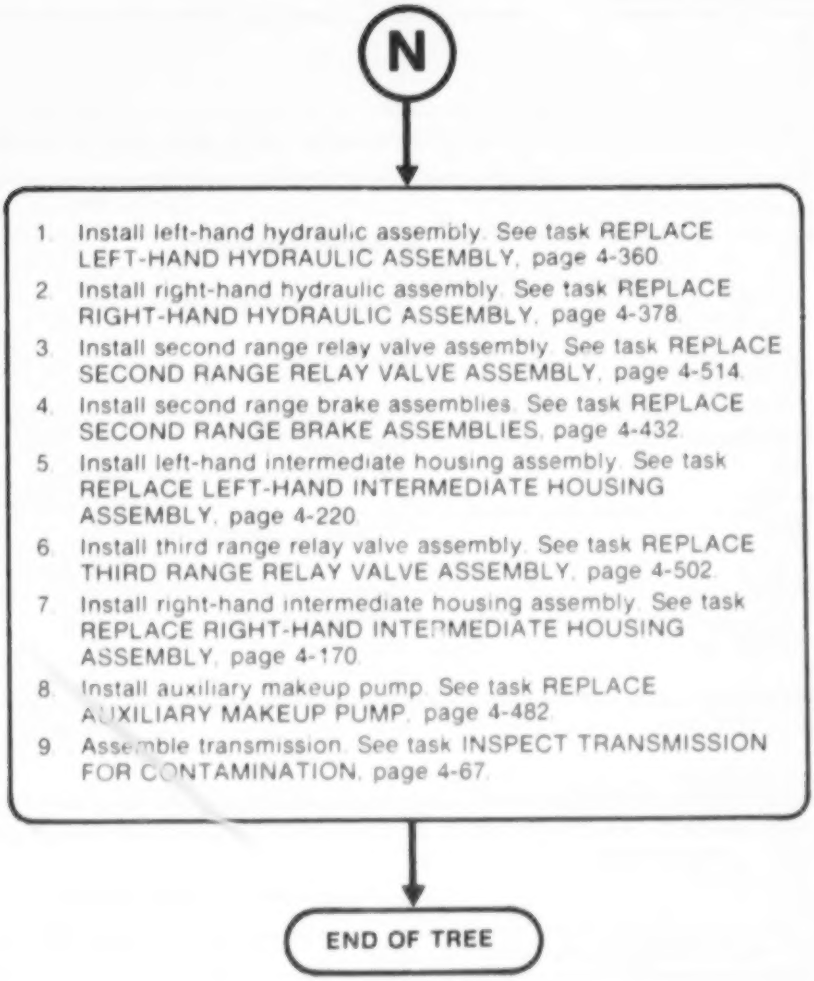


1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. Install second range brake assemblies. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
5. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. Install third range relay valve assembly. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.
7. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
8. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
9. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

NO PROPULSION - WITH STEER

DESCRIPTION

This tree covers inspection for a fault causing no propulsion - with steer and for making repairs when the fault is found.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Micrometer caliper set —
(Item 52, App C)
Telescoping gage set —
(Item 93, App C)

Materials/Parts

Preformed packing (3)

Personnel Required:

Track Veh Rep 63H10

References:

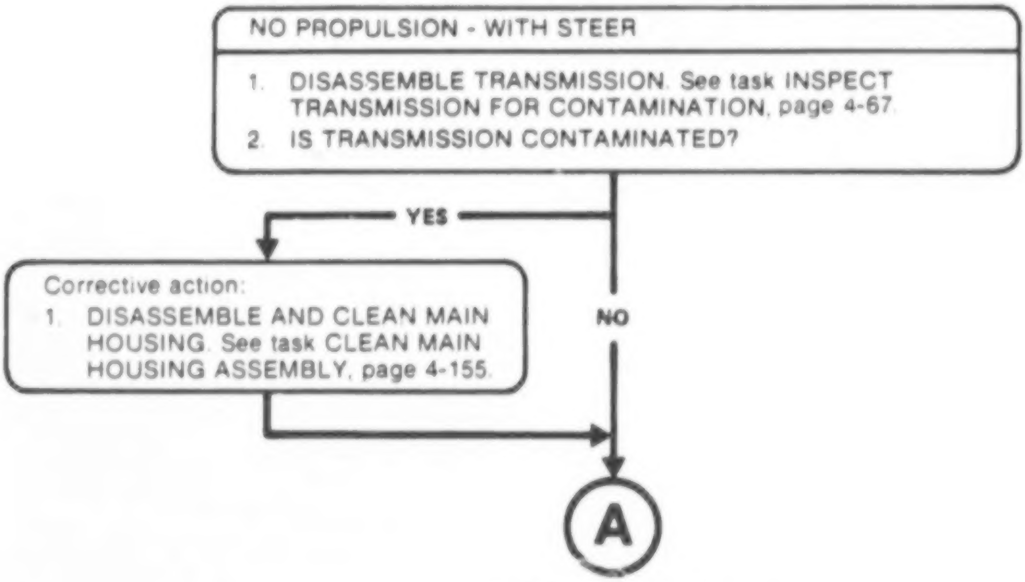
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



NO PROPULSION - WITH STEER

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

YES

Corrective action:
1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

NO

A

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A

1. REVIEW DA FORM 2407.
2. WAS SPEED REFERENCE PRESSURE REPORTED TO BE LOW?

NO

D

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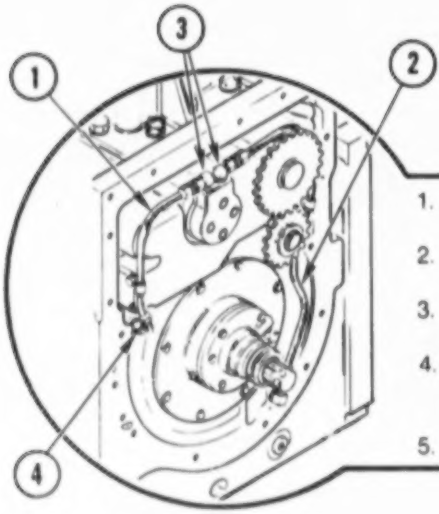
YES



1. Remove disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. Remove disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. Remove power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
4. INSPECT HOSE ASSEMBLIES 11628453-6 (1) 11627588-14 (2), HOSE TO BOSS ELBOWS (3), AND ADAPTER (4). See page 2-5.
5. IS ANY HOSE ASSEMBLY, ELBOW, OR ADAPTER DAMAGED?

YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLY AND/OR DAMAGED ELBOW OR ADAPTER. See task REPLACE HOSES AND PLUGS, page 4-2.

J

GO TO PAGE 2-128

NO

B

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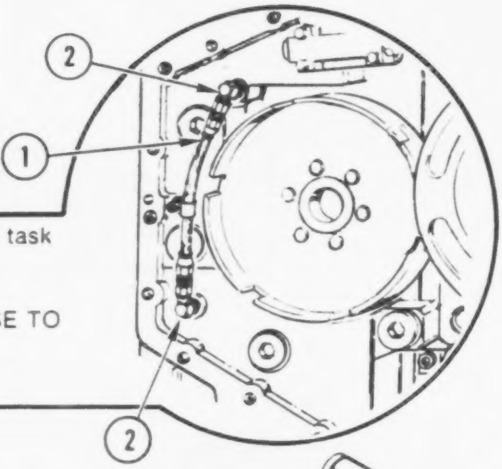
B



1. Remove right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. INSPECT HOSE ASSEMBLY 11627588-15 (1) AND HOSE TO BOSS ELBOWS (2). See page 2-5.
3. IS HOSE ASSEMBLY OR ANY ELBOW DAMAGED?

YES

Corrective action:
1. REPLACE DAMAGED HOSE ASSEMBLY AND/OR DAMAGED ELBOW. See task REPLACE HOSES AND PLUGS, page 4-2.

C

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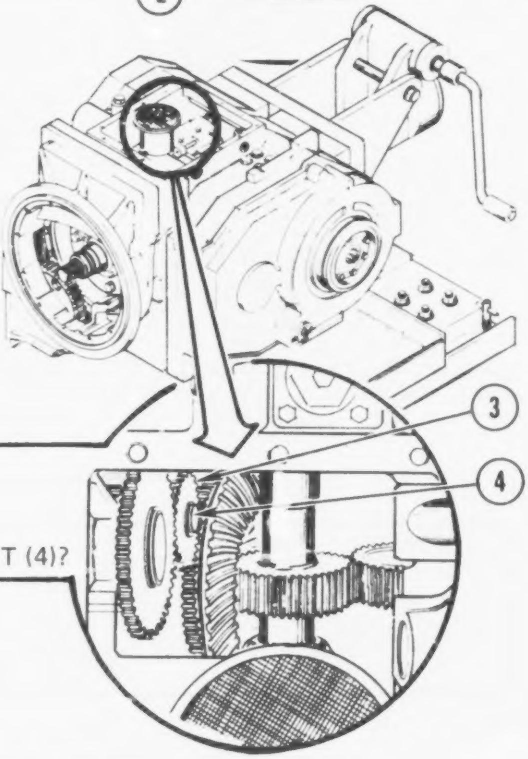
NO



1. INSPECT AUXILIARY MAKEUP PUMP GEAR TRAIN THROUGH SUMP OPENING.
2. IS IDLER SPUR GEAR (3) ON SHOULDERED SHAFT (4)?

YES

Corrective action:
1. REPLACE AUXILIARY MAKEUP PUMP.
2. RECORD AUXILIARY MAKEUP PUMP FAILURE ON DA FORM 2407 AND RETURN TO DEPOT.

NO

Correction action.
1. REPLACE IDLER SPUR GEAR. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

C

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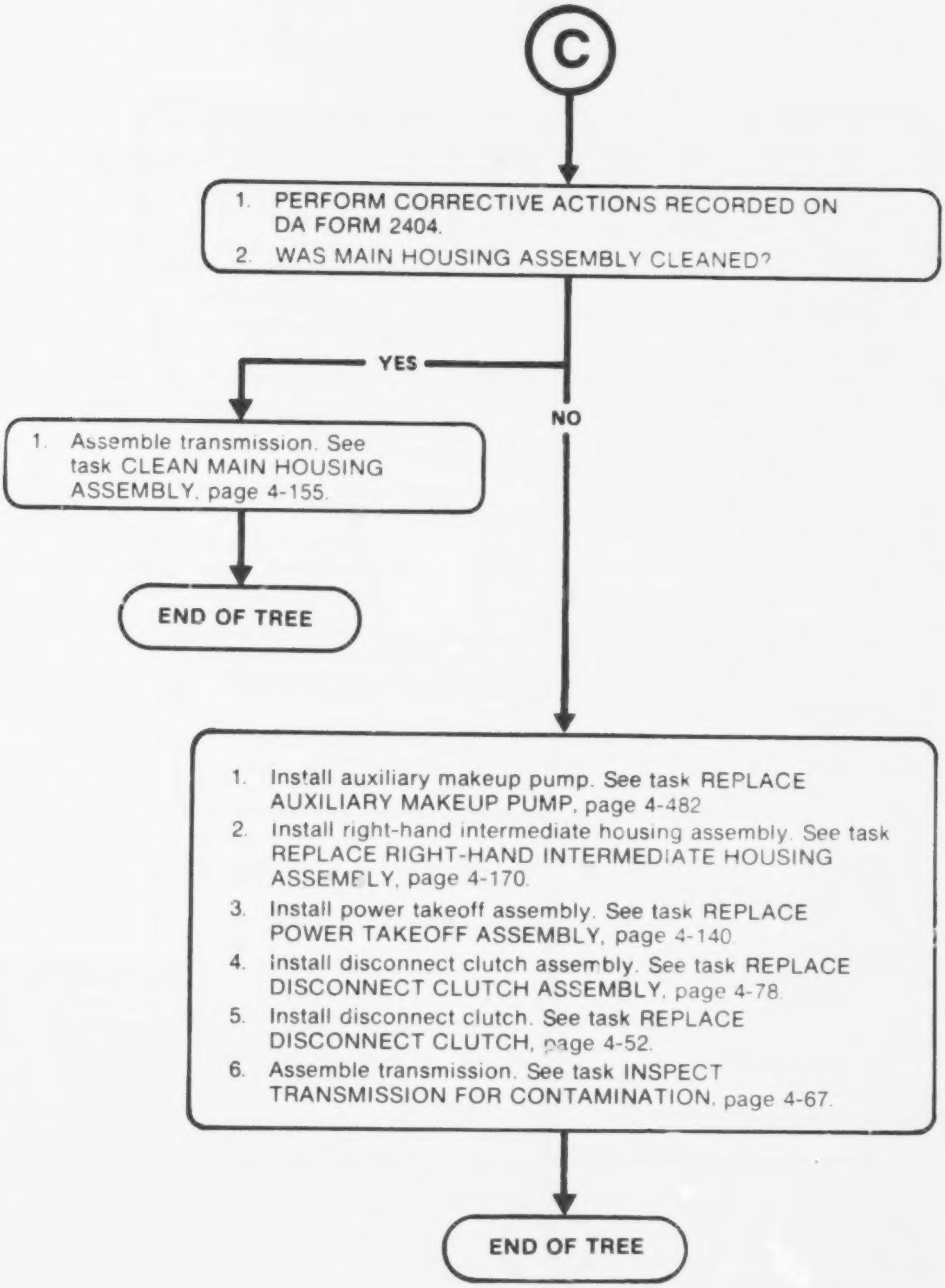


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

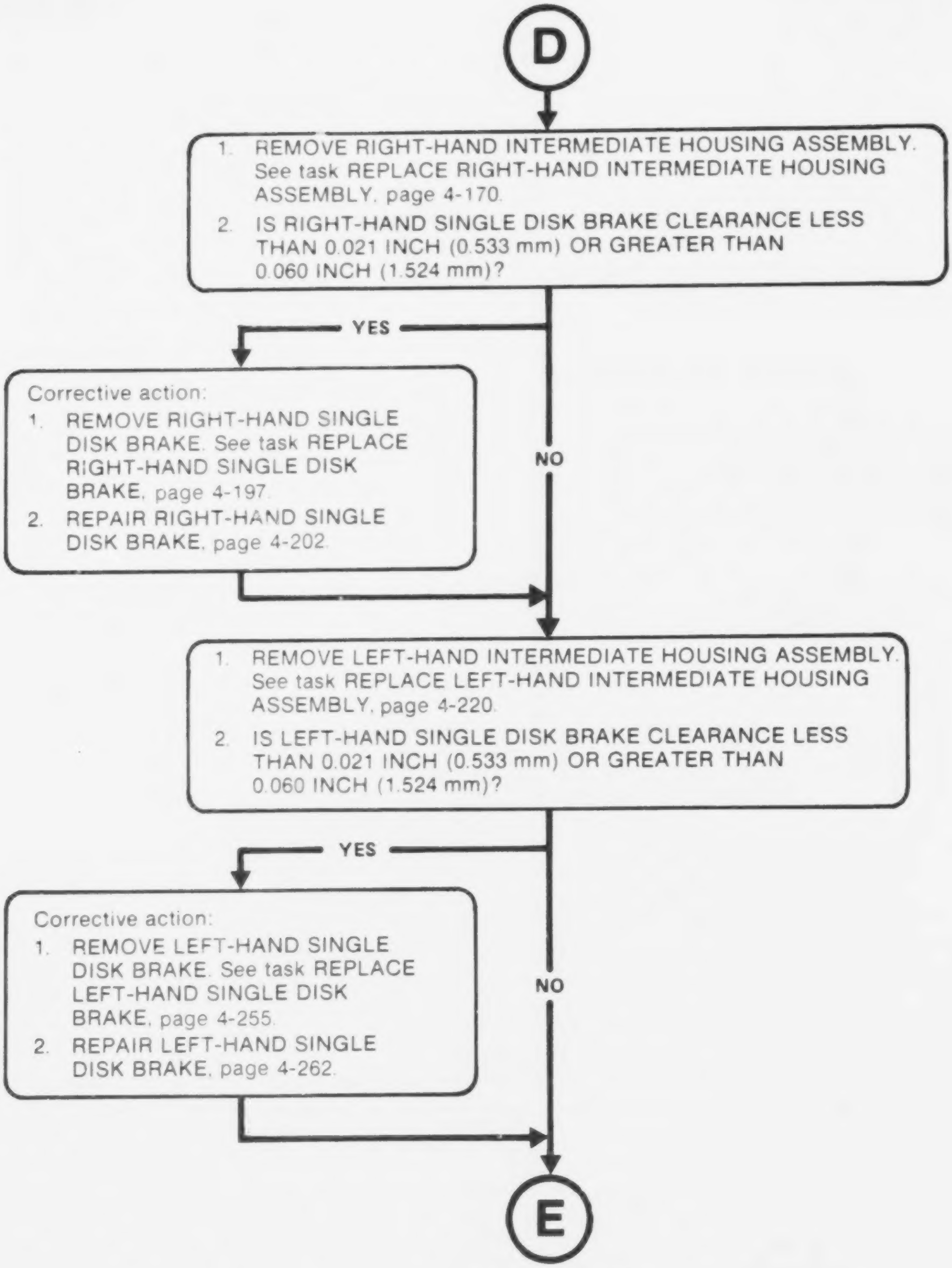
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install auxiliary makeup pump. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482
2. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
3. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
4. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
5. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
6. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
2. IS RIGHT-HAND SINGLE DISK BRAKE CLEARANCE LESS THAN 0.021 INCH (0.533 mm) OR GREATER THAN 0.060 INCH (1.524 mm)?

Corrective action:

1. REMOVE RIGHT-HAND SINGLE DISK BRAKE. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
2. REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-202.

1. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
2. IS LEFT-HAND SINGLE DISK BRAKE CLEARANCE LESS THAN 0.021 INCH (0.533 mm) OR GREATER THAN 0.060 INCH (1.524 mm)?

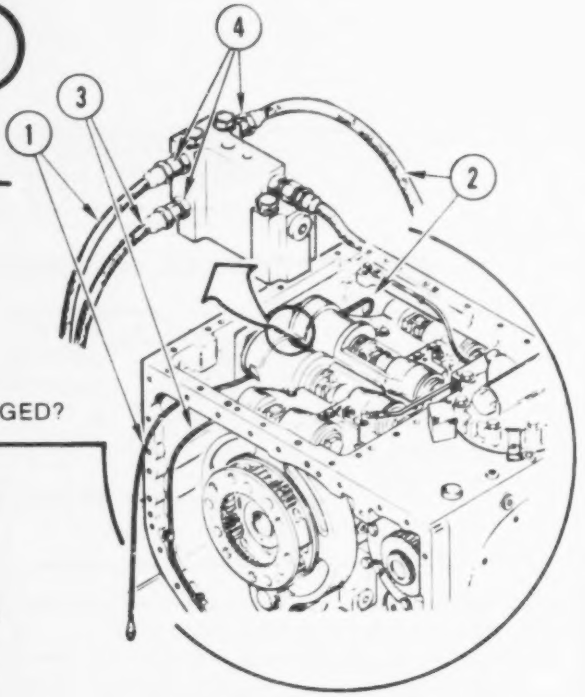
Corrective action:

1. REMOVE LEFT-HAND SINGLE DISK BRAKE. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
2. REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.

GO TO NEXT PAGE

E

1. Remove positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
2. Remove spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
3. INSPECT HOSE ASSEMBLIES 11629168-1 (1), 11629168-3 (2), AND 11629168-10 (3), AND ADAPTERS (4). See page 2-5.
4. IS ANY HOSE ASSEMBLY OR ADAPTER DAMAGED?



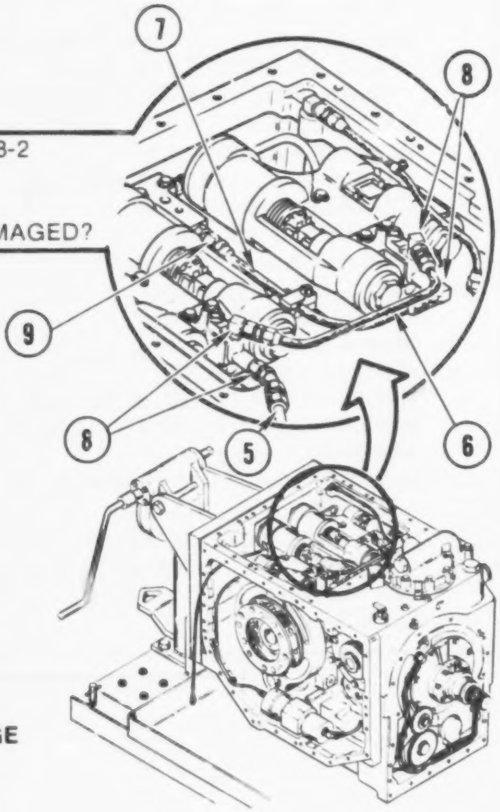
YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLY AND/OR DAMAGED ADAPTER. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

1. INSPECT HOSE ASSEMBLIES 11629168-9 (5), 11629168-2 (6), 11629168-7 (7), HOSE TO BOSS ELBOWS (8), AND ADAPTER (9). See page 2-5.
2. IS ANY HOSE ASSEMBLY, ELBOW, OR ADAPTER DAMAGED?



YES

Corrective action:

1. REPLACE DAMAGED HOSE ASSEMBLY AND/OR DAMAGED ELBOW OR ADAPTER. See task REPLACE HOSES AND PLUGS, page 4-2.

NO

F

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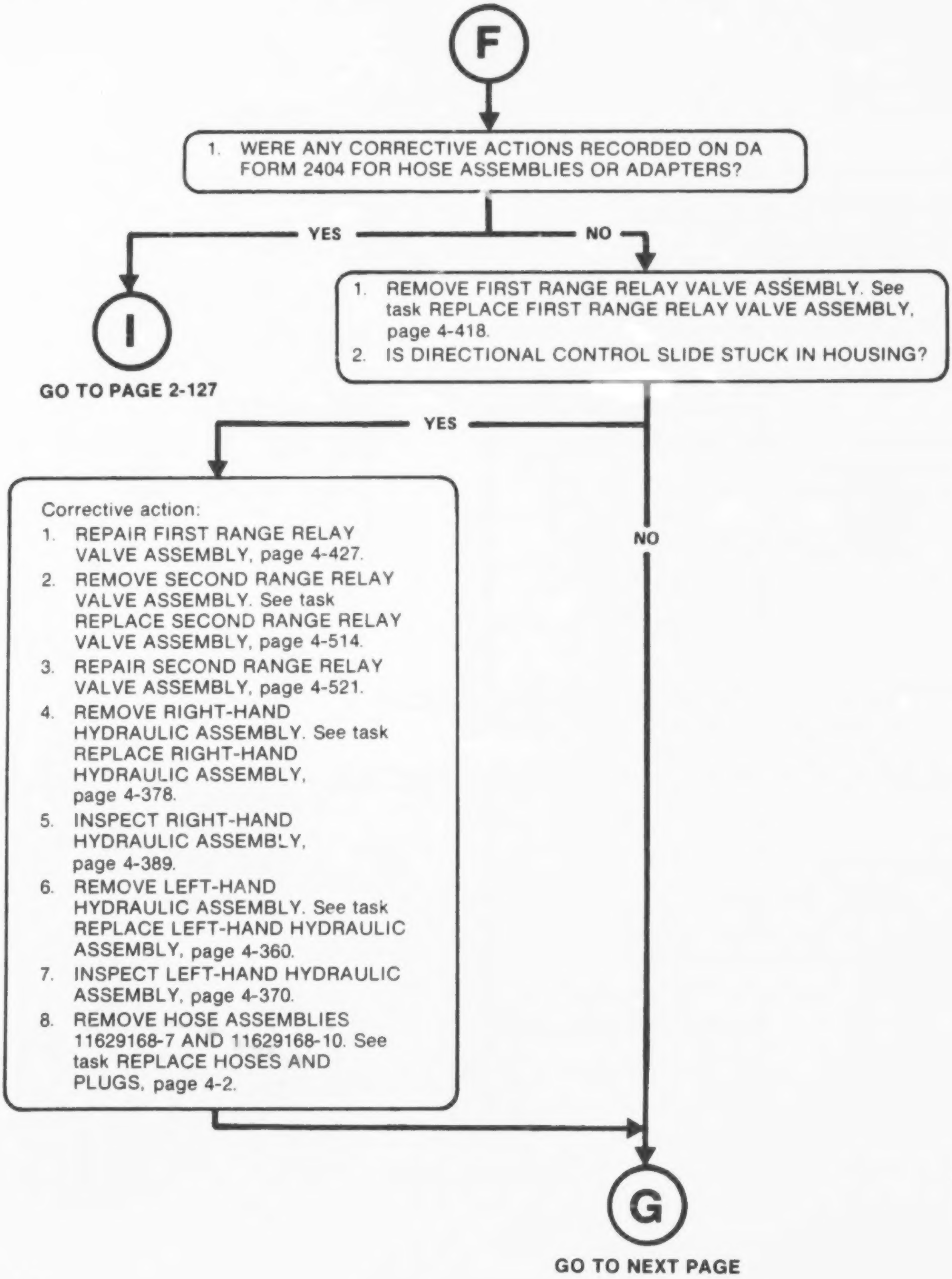

1. WERE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404 FOR HOSE ASSEMBLIES OR ADAPTERS?

GO TO PAGE 2-127

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. IS DIRECTIONAL CONTROL SLIDE STUCK IN HOUSING?

Corrective action:

1. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
2. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
3. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
4. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
5. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
6. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
7. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
8. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

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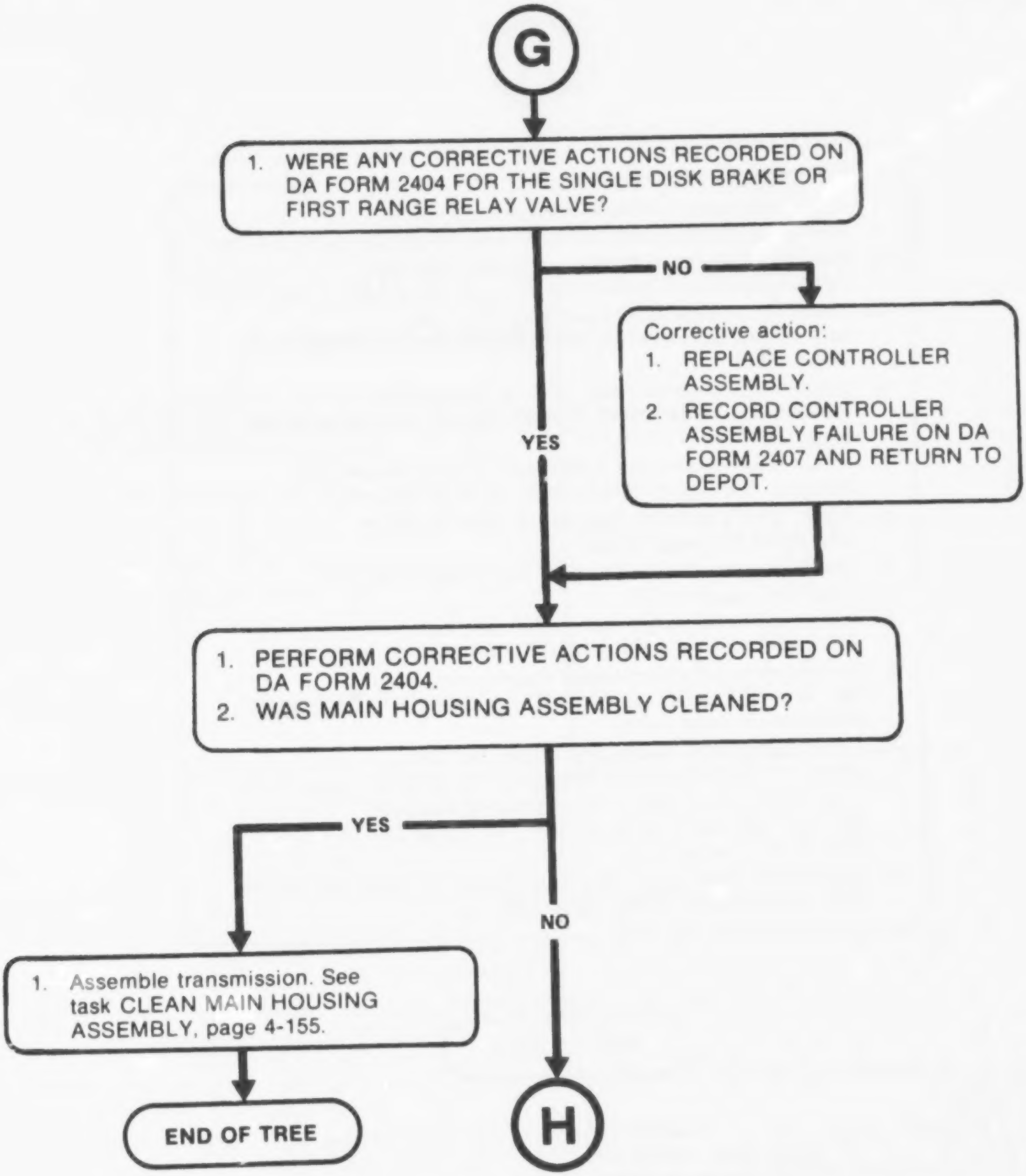

1. WERE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404 FOR THE SINGLE DISK BRAKE OR FIRST RANGE RELAY VALVE?

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN TO DEPOT.

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

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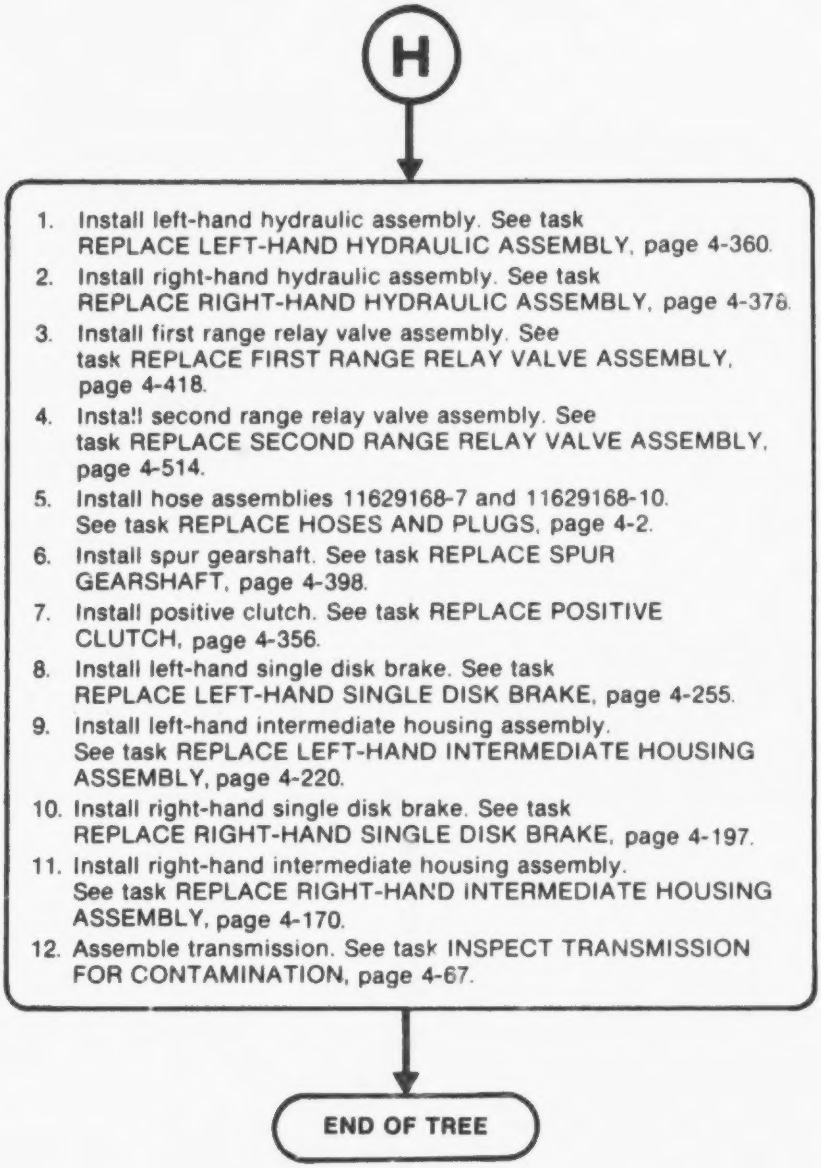
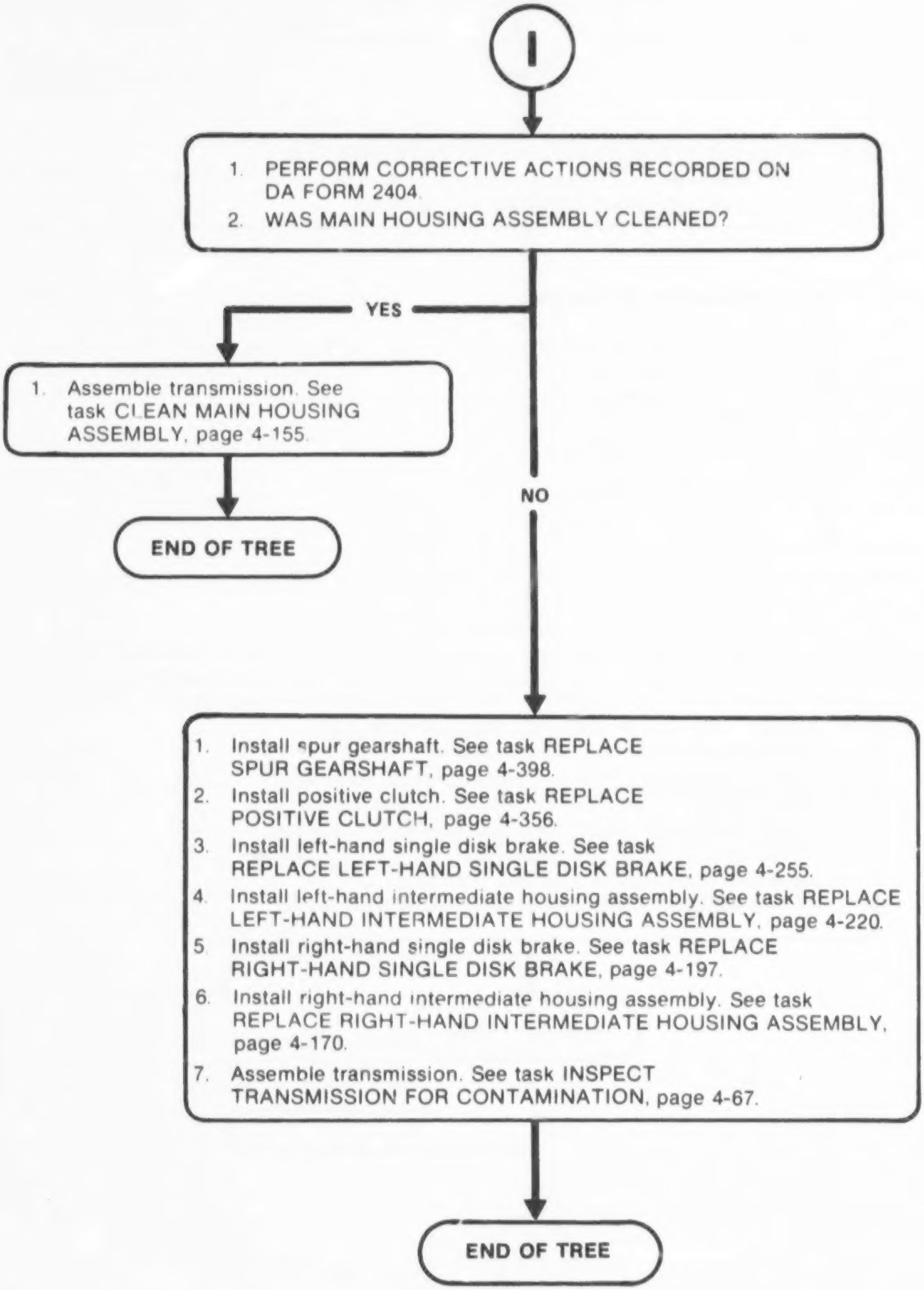


1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
7. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
8. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
9. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
10. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
11. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
12. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

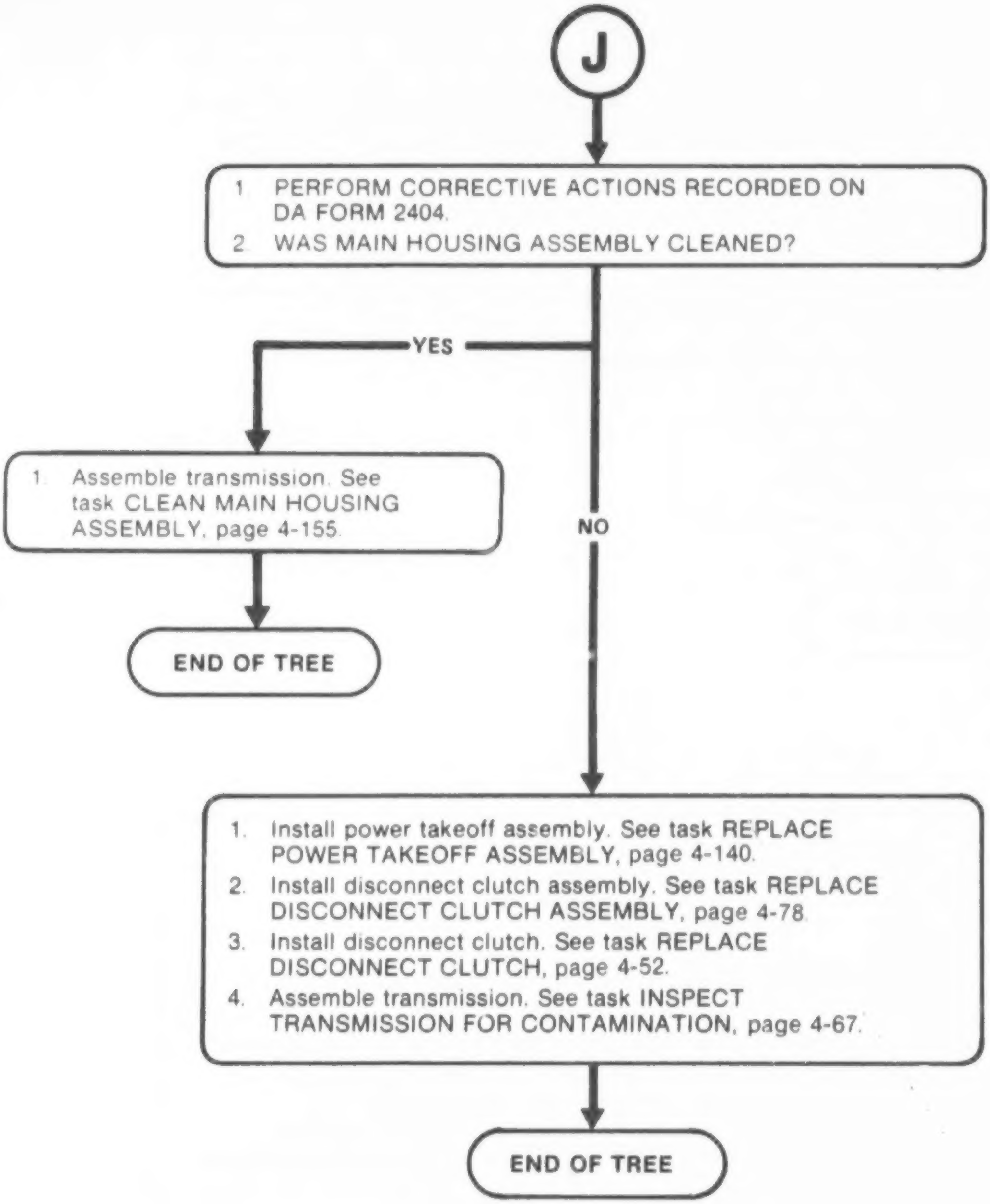
1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install spur gearshaft. See task REPLACE SPUR GEARSHAFT, page 4-398.
2. Install positive clutch. See task REPLACE POSITIVE CLUTCH, page 4-356.
3. Install left-hand single disk brake. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.
4. Install left-hand intermediate housing assembly. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
5. Install right-hand single disk brake. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
6. Install right-hand intermediate housing assembly. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
7. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

NO:

1. Install power takeoff assembly. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
2. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
4. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

NO PROPULSION - NO STEER

DESCRIPTION

This tree covers inspection for a fault causing no propulsion - no steer and for making repairs when the fault is found.

INITIAL SETUP

Tools:

Drag wrench — (Item 24, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

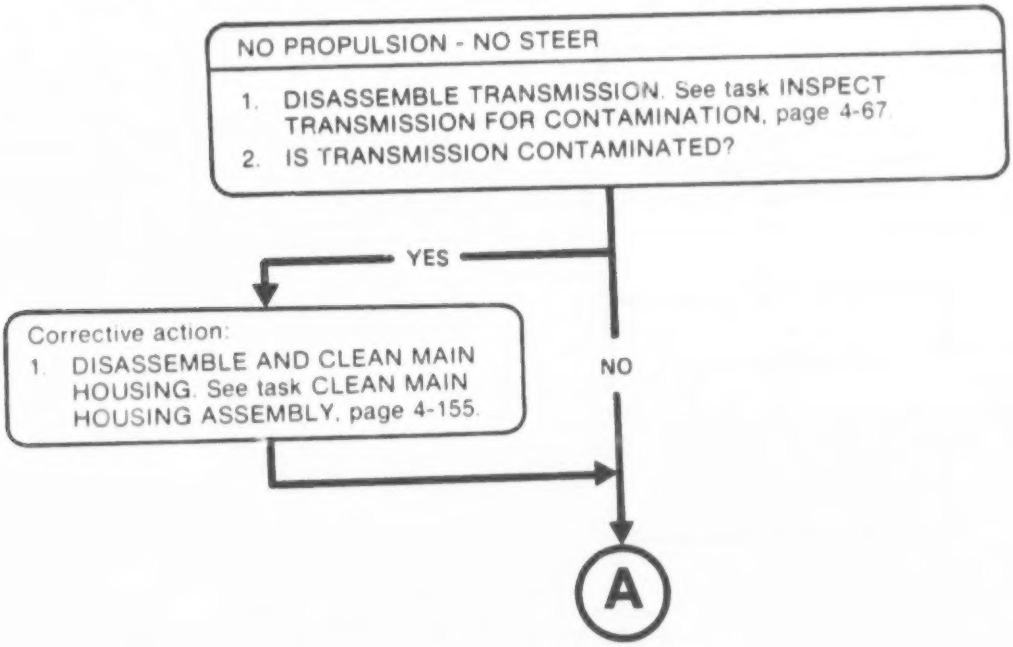
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.


NO PROPULSION - NO STEER
1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?
YES
NO
Corrective action:
1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.
A

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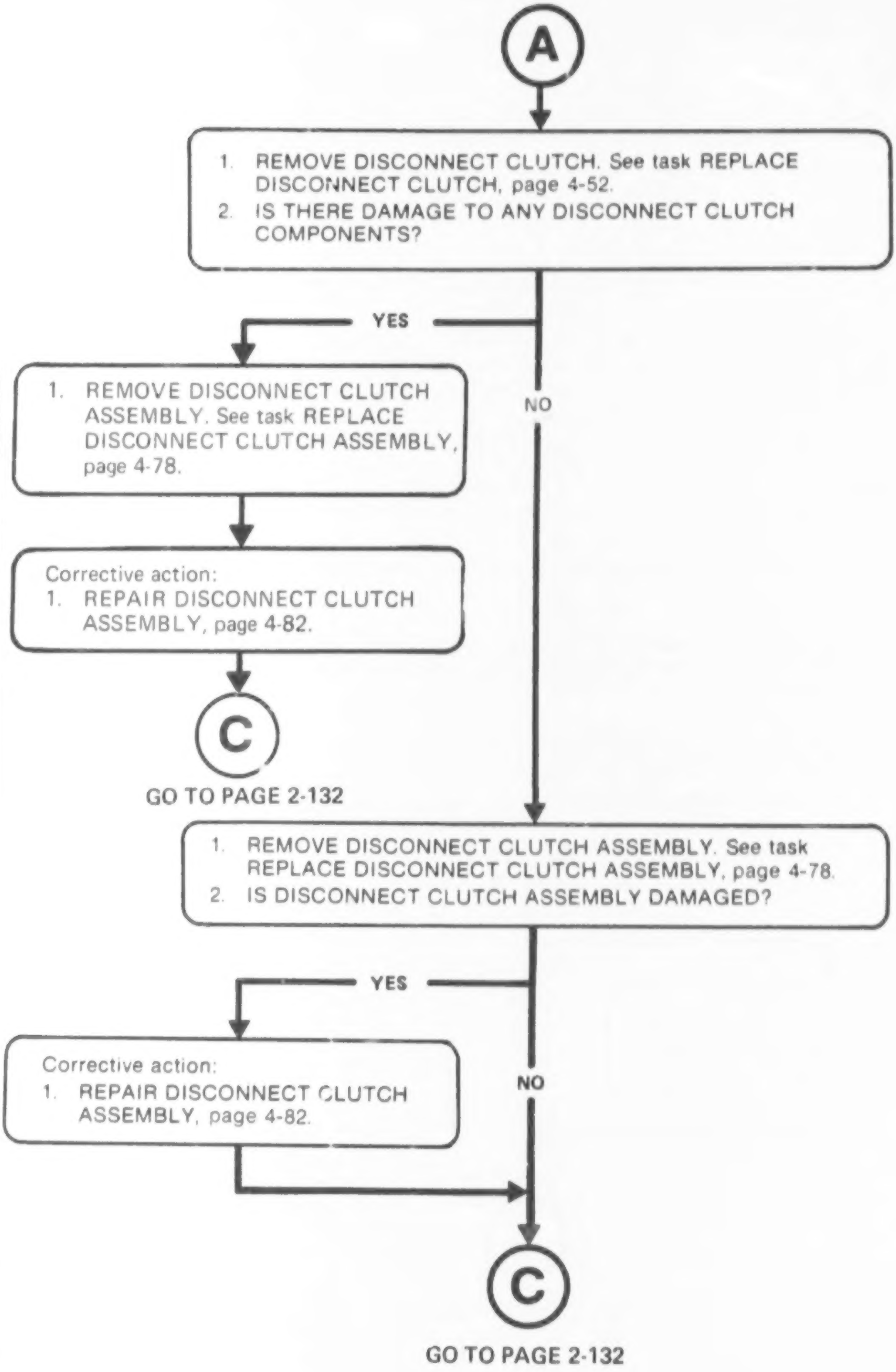

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. IS THERE DAMAGE TO ANY DISCONNECT CLUTCH COMPONENTS?

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

GO TO PAGE 2-132

1. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. IS DISCONNECT CLUTCH ASSEMBLY DAMAGED?

Corrective action:
1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

GO TO PAGE 2-132

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C

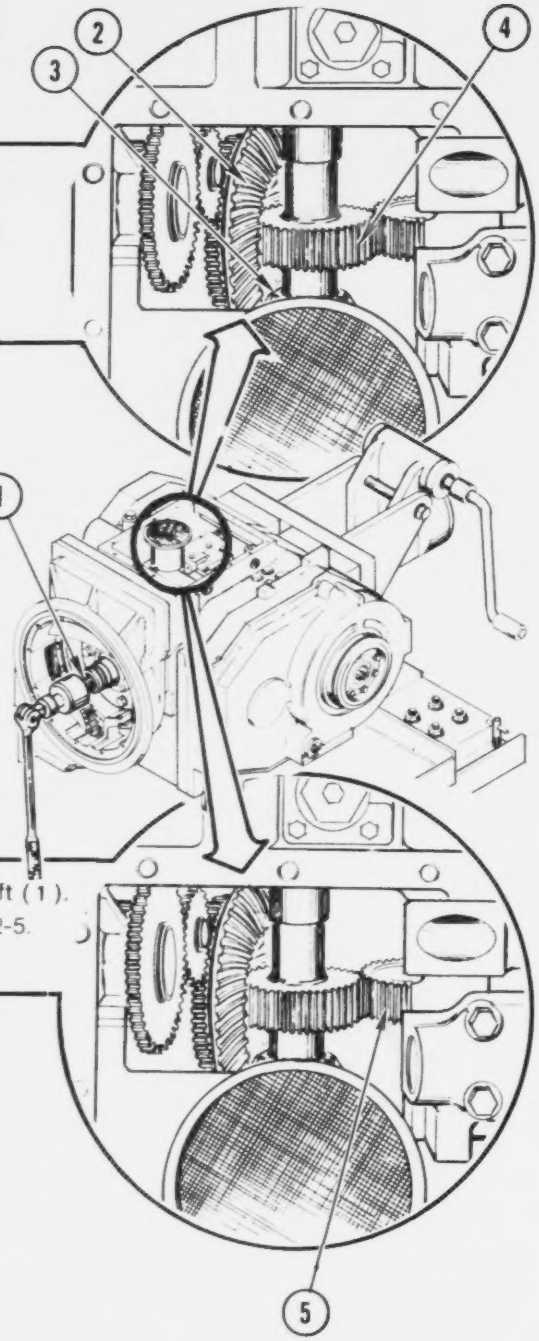
1. (H) Using drag wrench, slowly rotate input bevel shaft (1).
2. INSPECT INPUT BEVEL GEAR (2), SPIRAL BEVEL PINION GEAR (3), AND SPUR GEARSHAFT (4). See page 2-5.
3. IS ANY GEAR DAMAGED?

YES

Corrective action:

1. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.

NO



1. (H) Using drag wrench, slowly rotate input bevel shaft (1).
2. INSPECT INPUT IDLER SPUR GEAR (5). See page 2-5.
3. IS SPUR GEAR (5) DAMAGED?

YES

Corrective action:

1. REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

NO

D

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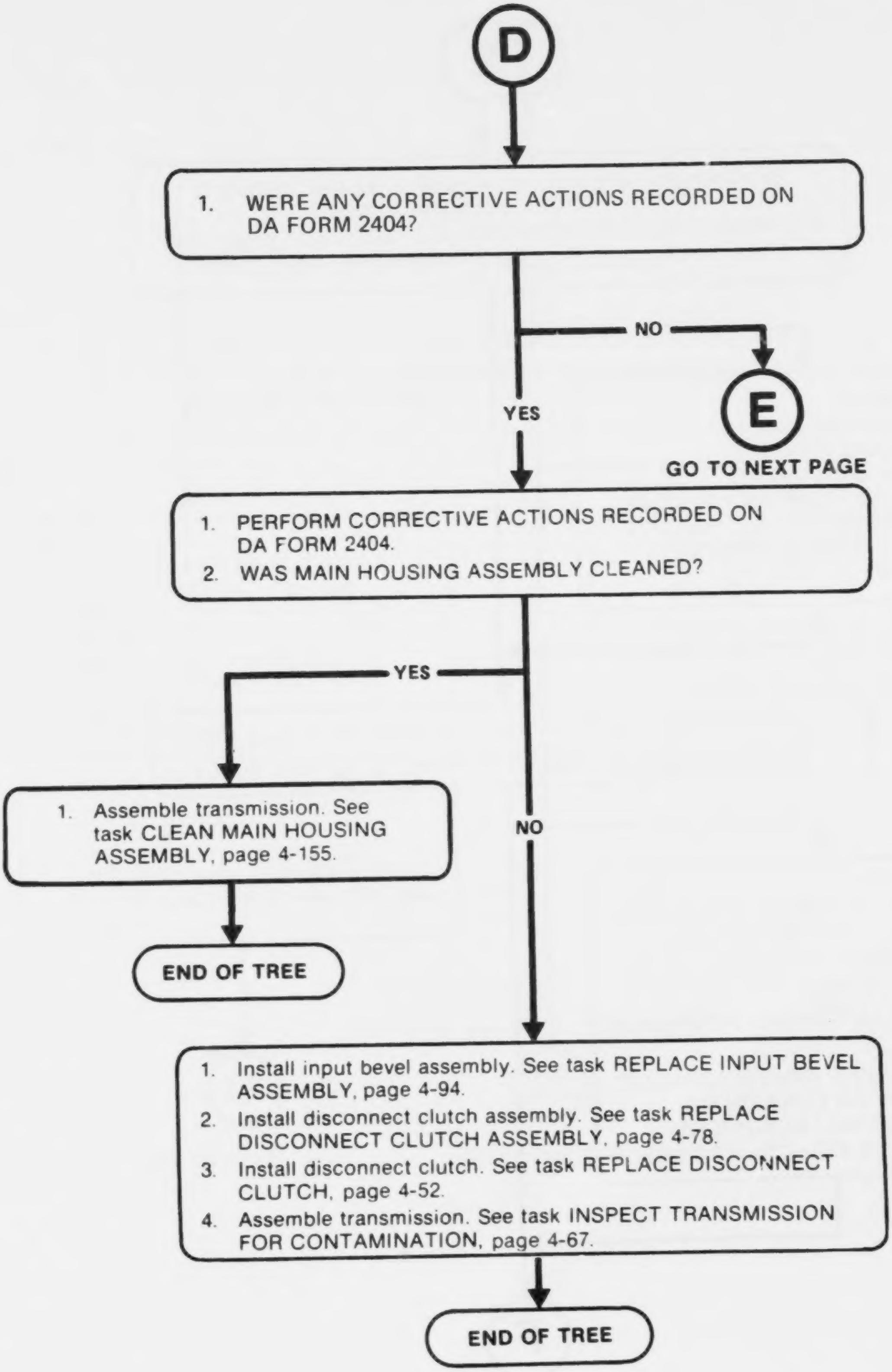

1. WERE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404?

1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install input bevel assembly. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.
2. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
4. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

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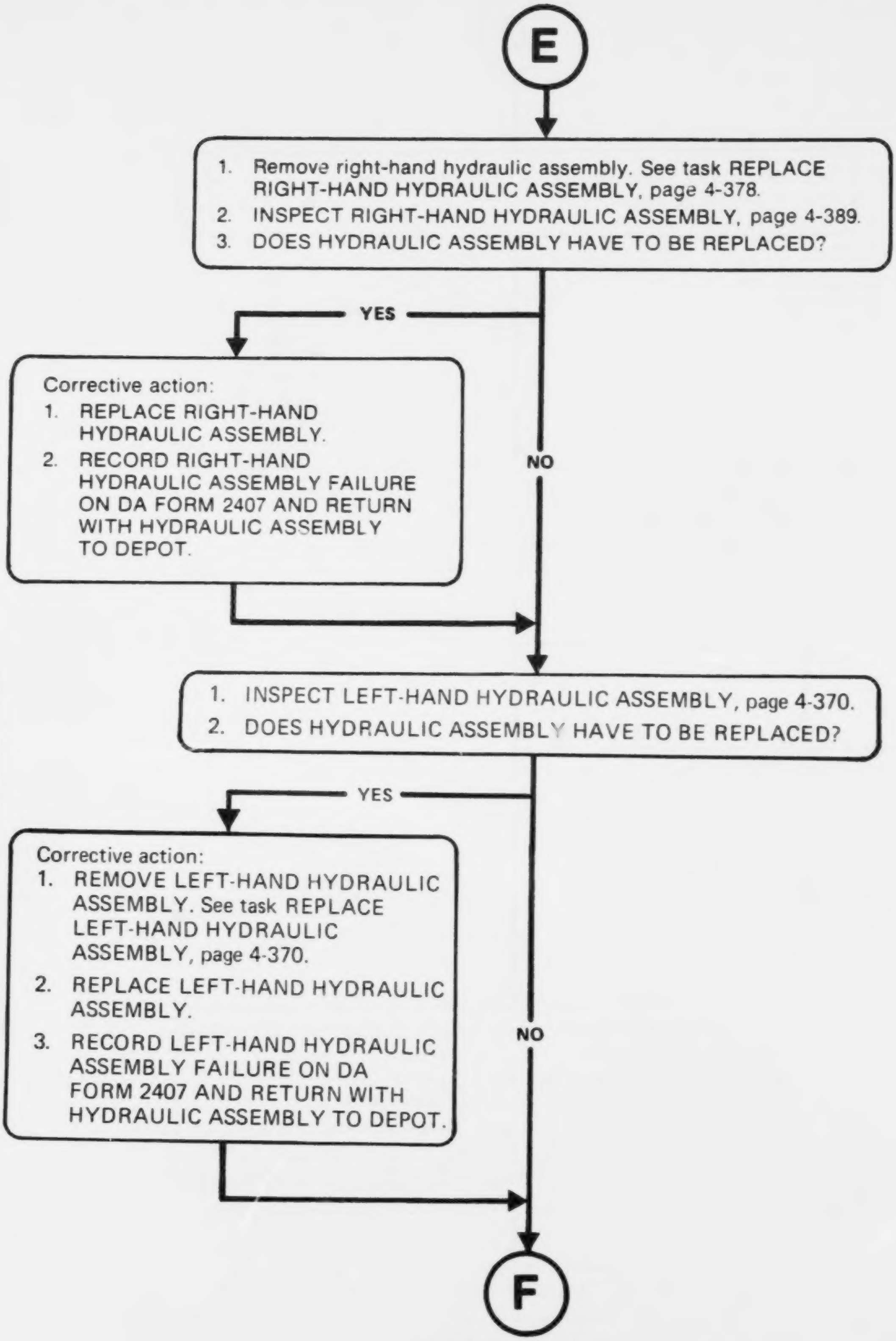

1. Remove right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
2. INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.
3. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

1. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.
2. RECORD RIGHT-HAND HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

1. INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. DOES HYDRAULIC ASSEMBLY HAVE TO BE REPLACED?

Corrective action:

1. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.
2. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.
3. RECORD LEFT-HAND HYDRAULIC ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH HYDRAULIC ASSEMBLY TO DEPOT.

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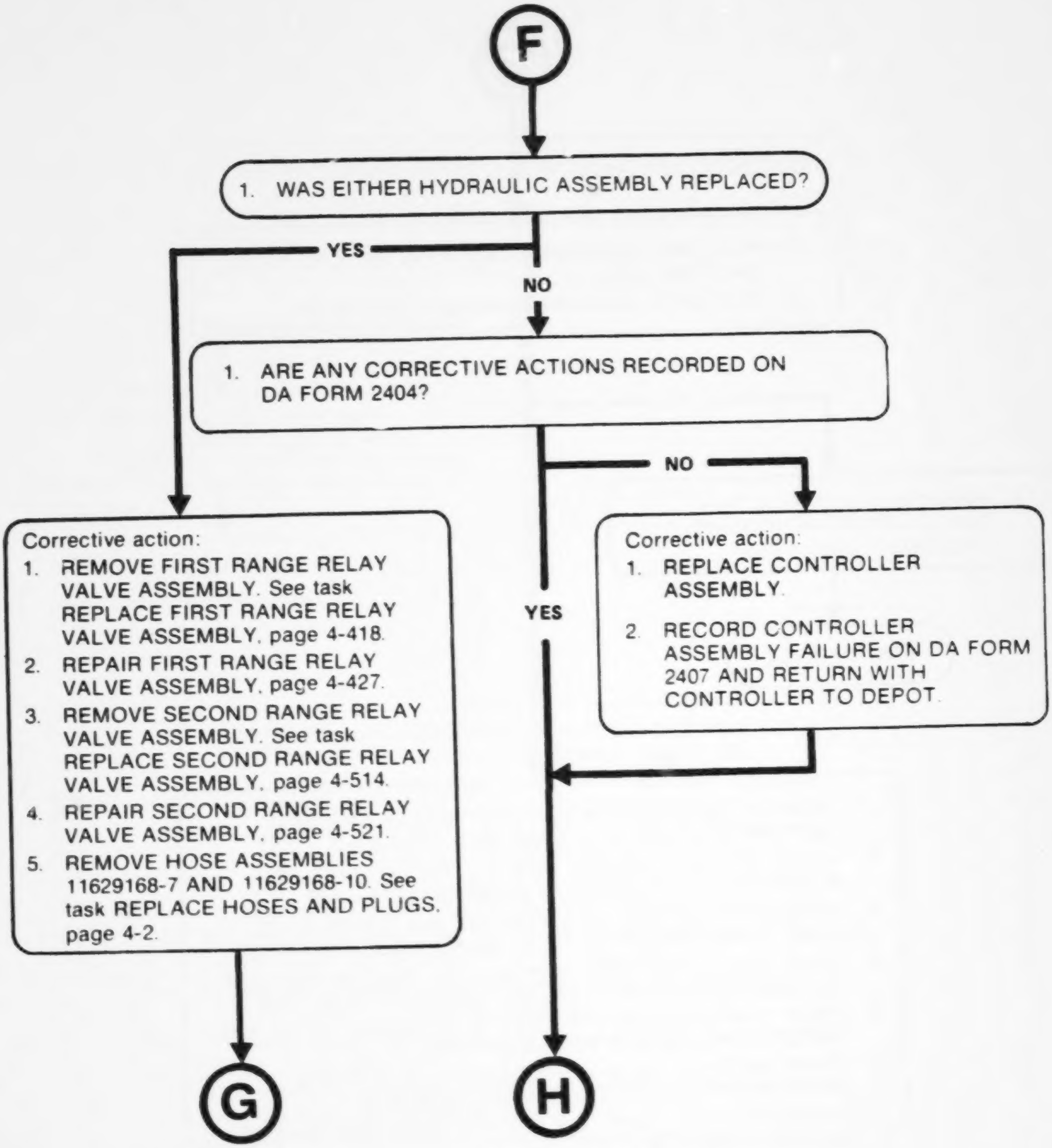

1. WAS EITHER HYDRAULIC ASSEMBLY REPLACED?

1. ARE ANY CORRECTIVE ACTIONS RECORDED ON DA FORM 2404?

Corrective action:

1. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
2. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
3. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
4. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.
5. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.

Corrective action:

1. REPLACE CONTROLLER ASSEMBLY.
2. RECORD CONTROLLER ASSEMBLY FAILURE ON DA FORM 2407 AND RETURN WITH CONTROLLER TO DEPOT.

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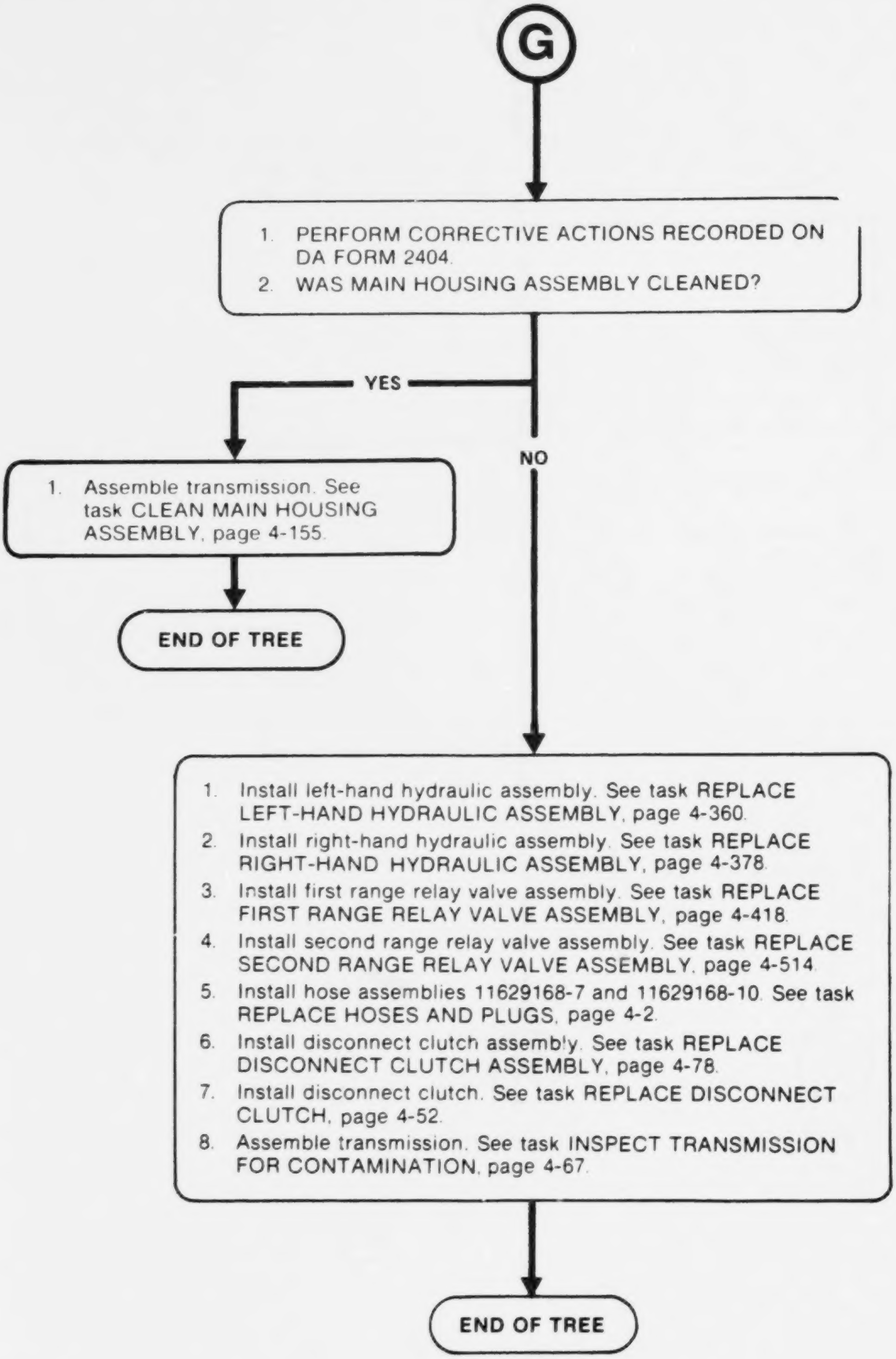
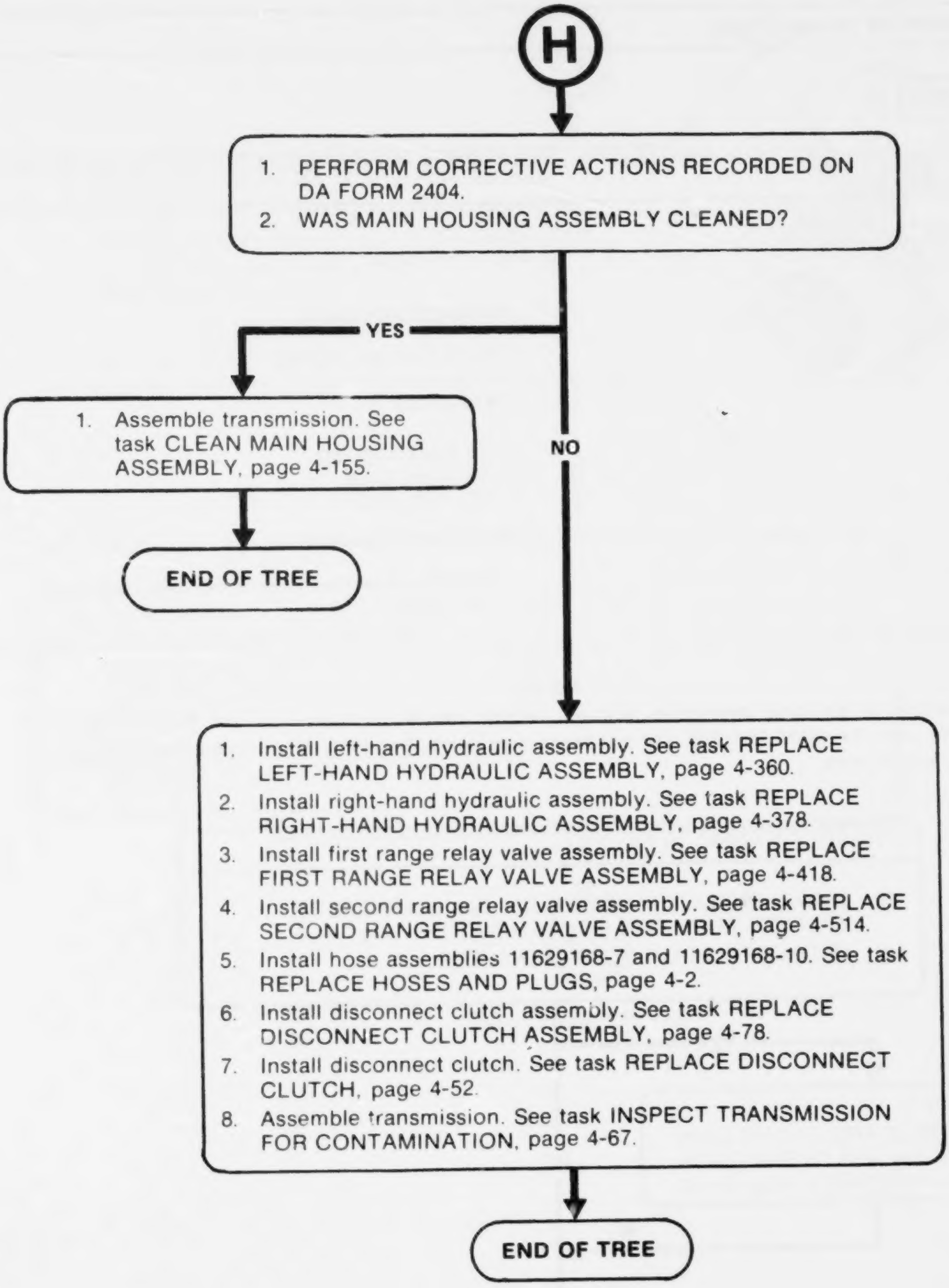
GO TO PAGE 2-137



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
7. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
8. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.



1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

YES:

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

END OF TREE

NO:

1. Install left-hand hydraulic assembly. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.
2. Install right-hand hydraulic assembly. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.
3. Install first range relay valve assembly. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.
4. Install second range relay valve assembly. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.
5. Install hose assemblies 11629168-7 and 11629168-10. See task REPLACE HOSES AND PLUGS, page 4-2.
6. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
7. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
8. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

END OF TREE

VEHICLE STEERS IN NEUTRAL

DESCRIPTION

This tree covers inspection for a fault causing vehicle steers in neutral and for making repairs when the fault is found.

INITIAL SETUP

Personnel Required:

Track Veh Rep 63H10

References:

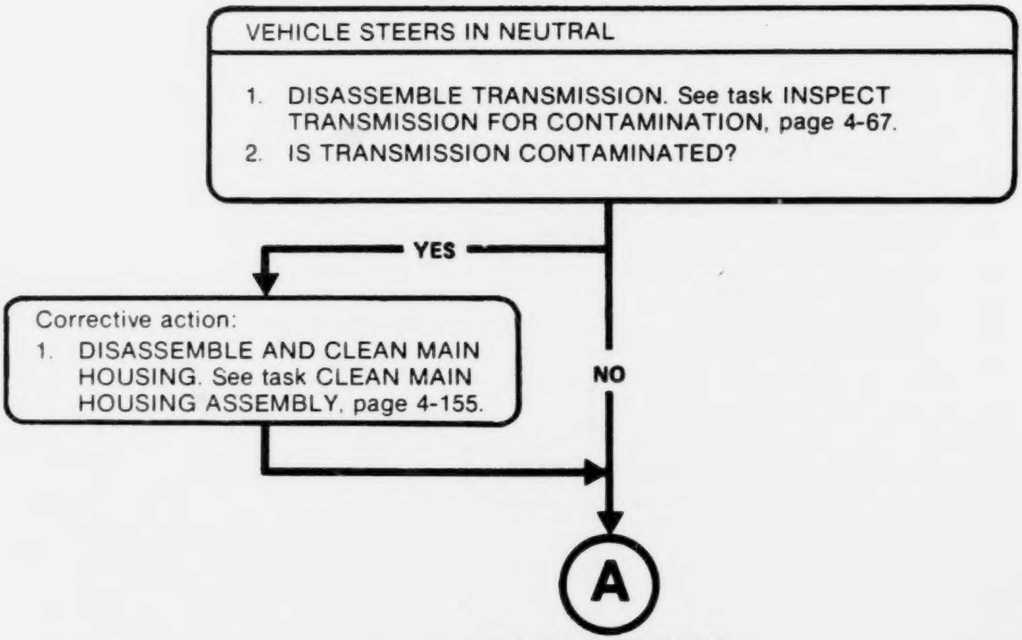
DA PAM 738-750
DA Form 2404
DA Form 2407

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

When directed to perform corrective actions, record necessary tasks on DA Form 2404 in accordance with DA PAM 738-750. Do not make any corrective actions or repairs until directed to do so at end of tree.



VEHICLE STEERS IN NEUTRAL

1. DISASSEMBLE TRANSMISSION. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
2. IS TRANSMISSION CONTAMINATED?

Corrective action:

1. DISASSEMBLE AND CLEAN MAIN HOUSING. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

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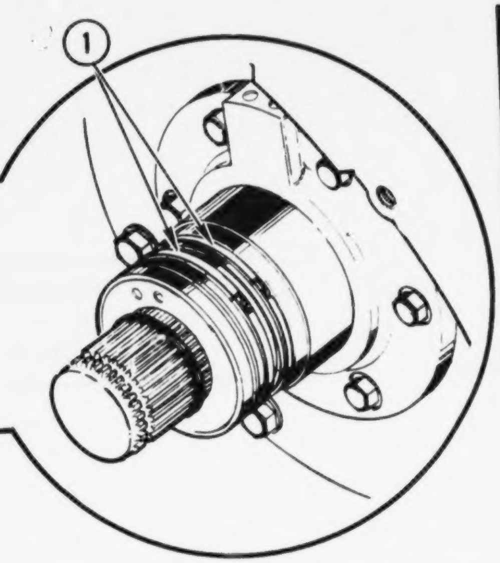
Ⓐ

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. DID INSPECTION OF SHAFT SEALS (1) REVEAL DAMAGE?



YES

Corrective action:

1. REPLACE SHAFT SEALS. See task REPLACE INPUT BEVEL ASSEMBLY SHAFT SEALS, page 4-122.
2. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

NO

Corrective action:

1. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

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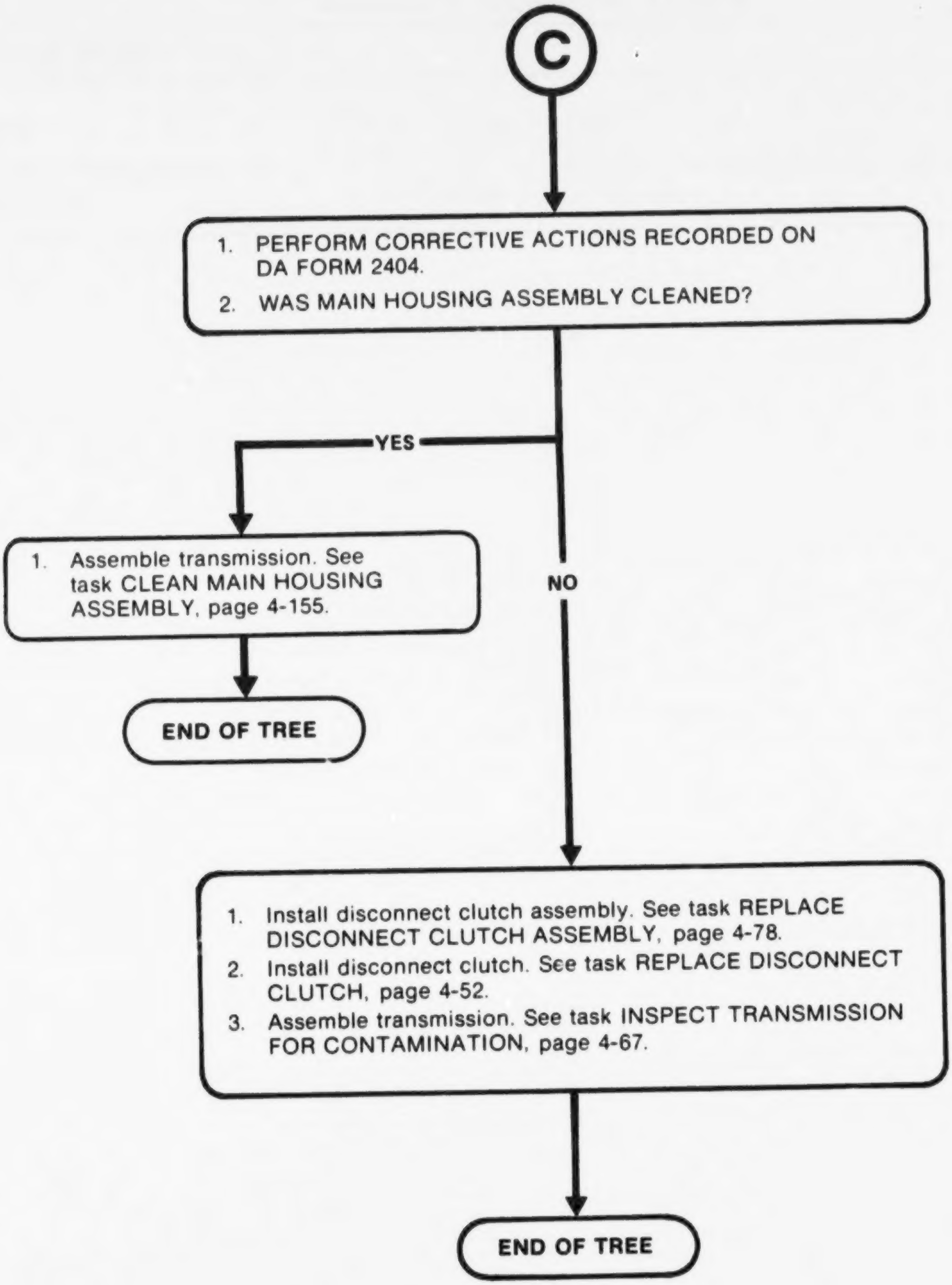


1. PERFORM CORRECTIVE ACTIONS RECORDED ON DA FORM 2404.
2. WAS MAIN HOUSING ASSEMBLY CLEANED?

1. Assemble transmission. See task CLEAN MAIN HOUSING ASSEMBLY, page 4-155.

1. Install disconnect clutch assembly. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
2. Install disconnect clutch. See task REPLACE DISCONNECT CLUTCH, page 4-52.
3. Assemble transmission. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.

Section V. GENERAL TASKS

TASK INDEX

Task	Page
Prepare Transmission for Servicing	2-144
Prepare Transmission for Shipping or Storage	2-153

PREPARE TRANSMISSION FOR SERVICING

DESCRIPTION

This task covers the following subtasks:

Subtask	Page
Remove Transmission from Shipping/Storage Container	2-144
Install Transmission on Tip-over Stand with Transmission Mounting Plate Kit	2-149

It includes:

1. Removal of the transmission from the shipping/storage container.
2. Installation of the transmission on the tip-over stand.
3. Removal of protective covers, caps, plugs, and gaskets.

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Lifting sling — (Item 44, App C)
Tip-over stand — (Item 96, App C)
Torque wrench — (Item 100, App C)
Transmission mounting plate kit — (Item 104, App C)
Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Plastic bag — (Item 9, App B)
Wood block (2) — (Item 5, App D)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

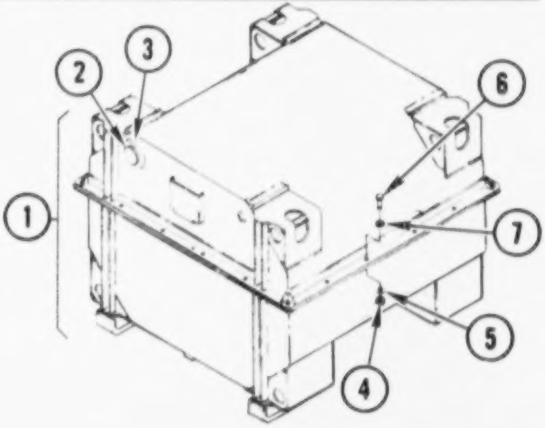
Transmission installed in Shipping/Storage Container. See page 2-153.

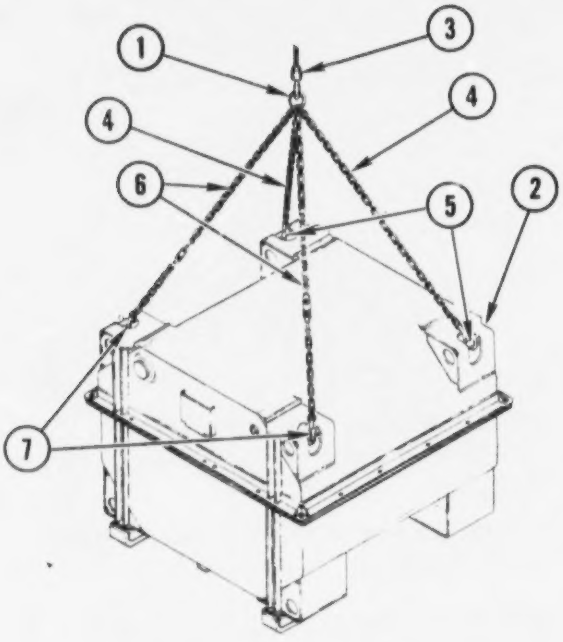
NOTE

Reusable mounting hardware is put in shipping bag and stored in container. All other reusable hardware/parts also should be placed in plastic bag(s) and stored in container for future use.

REMOVE TRANSMISSION FROM SHIPPING/STORAGE CONTAINER

1. RELEASE SHIPPING/STORAGE CONTAINER (1) INTERNAL PRESSURE.
   a. Depress and hold pressure equalizing valve button (2) on access cover (3) to vent internal pressure of container (1).
2. REMOVE 20 SELF-LOCKING NUTS (4), WASHERS (5), SCREWS (6), AND WASHERS (7). DO NOT DISCARD NUTS.





2.1 ATTACH LIFTING SLING (1).

a. Attach sling (1) to lifting device (3).

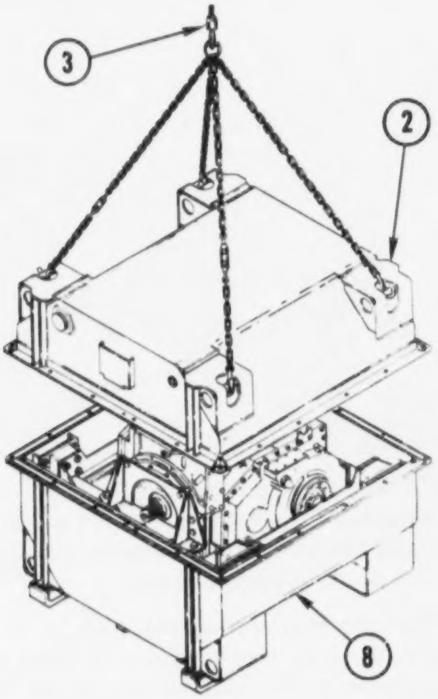
3. REPAIRER AND HELPER ATTACH LIFTING SLING (1) TO TRANSMISSION UPPER CONTAINER (2).

a. Using lifting device (3), lower sling (1) to reach upper container (2).

b. Attach two legs (4) of sling (1) to rear lifting points (5).

c. Attach two turnbuckle legs (6) of sling (1) to front lifting points (7).

d. (H) Adjust length of two turnbuckle legs (6), if necessary.



WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

4. REMOVE TRANSMISSION UPPER CONTAINER (2) FROM TRANSMISSION LOWER CONTAINER (8).

a. Using lifting device (3), remove upper container (2) from lower container (8).

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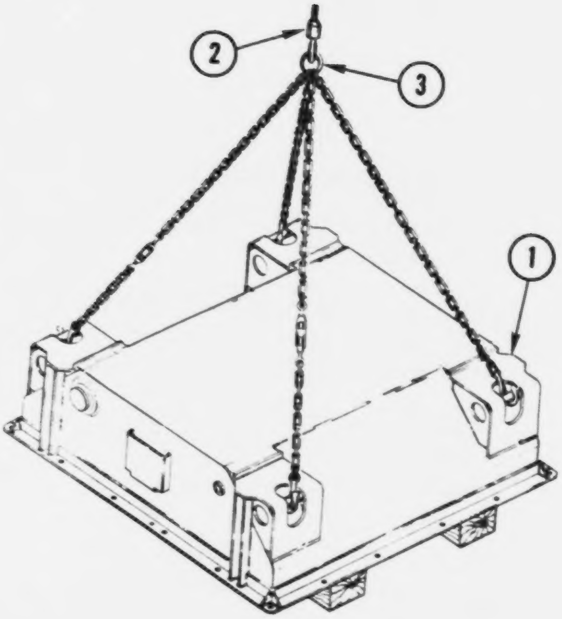
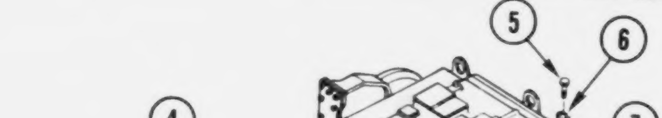
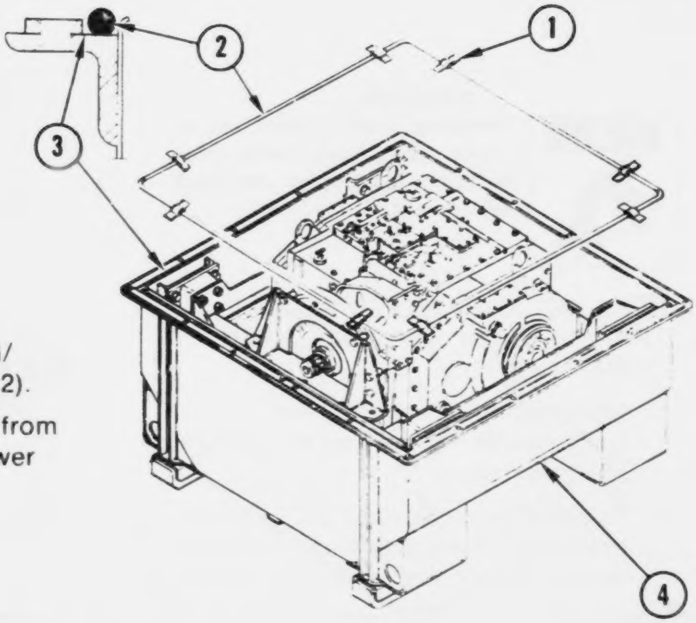


5. REPAIRER AND HELPER POSITION UPPER CONTAINER (1) ON PROTECTIVE BLOCKS.
   a. Using lifting device (2), place upper container (1) onto blocks.
6. REPAIRER AND HELPER REMOVE SLING (3) FROM UPPER CONTAINER (1).

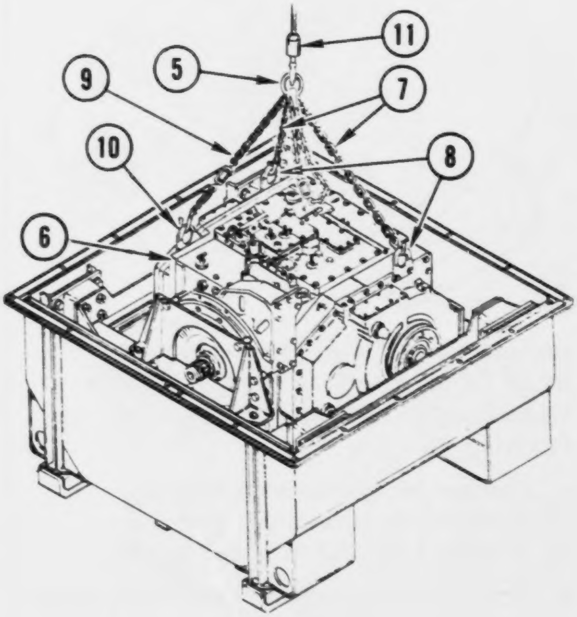


7. RELEASE TRANSMISSION (4).
   a. Remove four screws (5), lock washers (6), and washers (7) from front transmission container mount (8). Put parts in shipping bag.
   b. Remove four screws (5), lock washers (6), and washers (7) from rear transmission container mount (9). Put parts in shipping bag.



8. REMOVE TAPE (1) AND SHIPPING/ STORAGE CONTAINER GASKET (2).
   a. Remove tape (1) and gasket (2) from lip (3) of mounting flange on lower container (4). Discard tape.

9. INSPECT GASKET (2) FOR DAMAGE. See page 2-5.
   a. Discard gasket (2) if damaged.



10. REPAIRER AND HELPER ATTACH SLING (5) TO TRANSMISSION (6).
    a. Attach two legs (7) of sling (5) to front lifting eyes (8).
    b. (H) Attach turnbuckle leg (9) of sling (5) to rear lifting eye (10).

11. REPAIRER AND HELPER TRANSFER WEIGHT OF TRANSMISSION (6) TO SLING (5) AND LIFTING DEVICE (11).
    a. (H) Raise lifting device (11) until sling (5) is tight.
    b. Adjust length of turnbuckle leg (9), if necessary.

GO TO NEXT PAGE

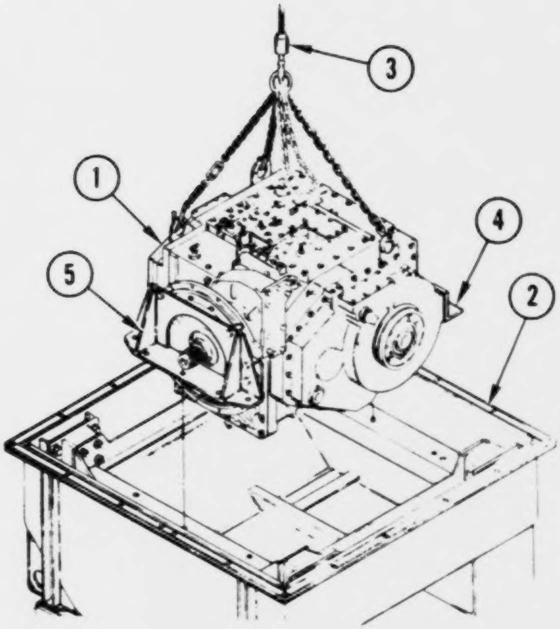
WARNING

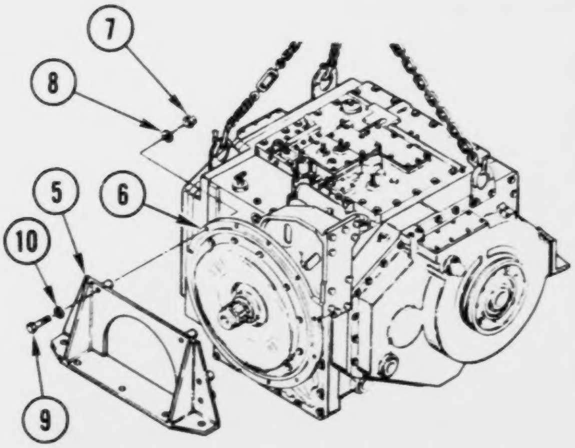
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

12. REPAIRER AND HELPER REMOVE TRANSMISSION (1) FROM LOWER CONTAINER (2).

    a. Using lifting device (3), raise transmission (1) out and away from lower container (2).

    b. Position transmission (1) at working height for removal of front container mount (4) and rear container mount (5).

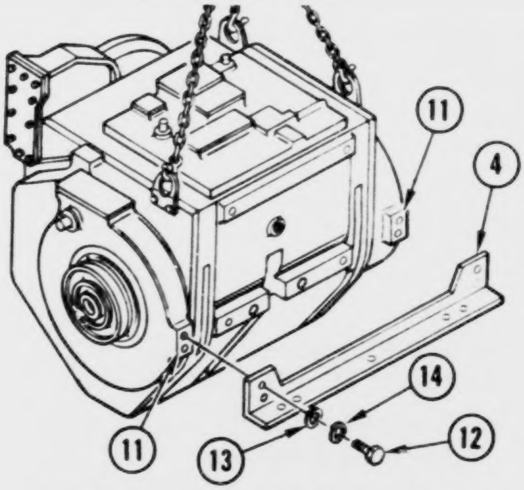




13. REPAIRER AND HELPER REMOVE REAR CONTAINER MOUNT (5) FROM TRANSMISSION INPUT MOUNTING FLANGE (6).

    a. Remove six self-locking nuts (7), washers (8), screws (9), and washers (10). Put in shipping bag.

    b. Remove rear container mount (5). Place in lower container.



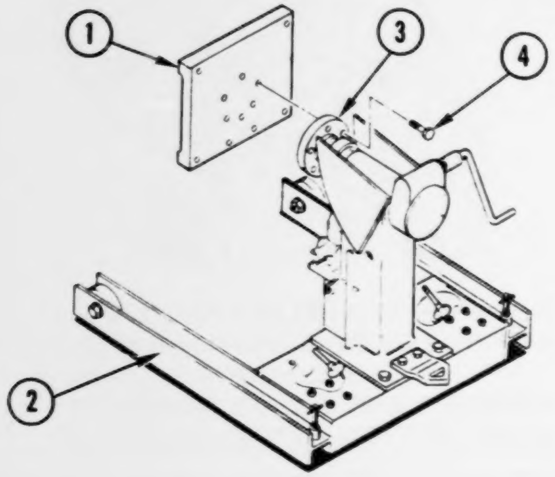
14. REPAIRER AND HELPER REMOVE FRONT CONTAINER MOUNT (4) FROM TRANSMISSION OUTPUT HOUSINGS (11).

    a. Remove four screws (12), washers (13), and lock washers (14). Put in shipping bag.

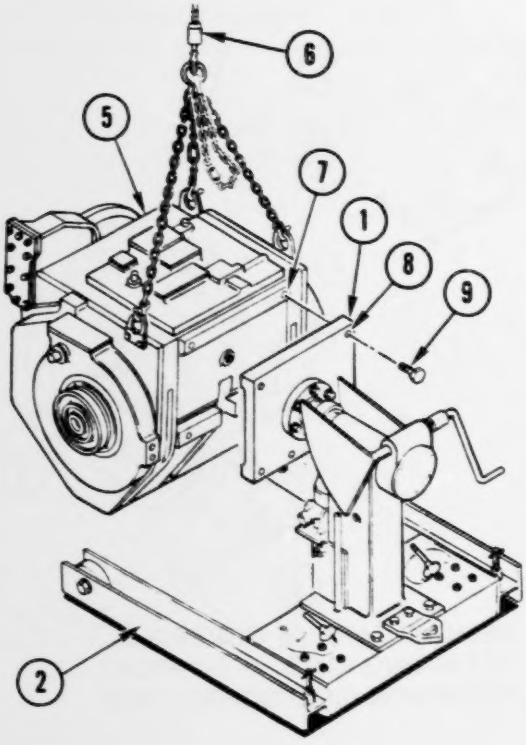
    b. Remove front container mount (4). Place in lower container.

END OF SUBTASK

INSTALL TRANSMISSION ON TIP-OVER STAND WITH TRANSMISSION MOUNTING PLATE KIT



1. REPAIRER AND HELPER INSTALL TIP-OVER STAND FIXTURE (1) ON TIP-OVER STAND (2).
   a. If fixture (1) is not on stand (2), go to step 1b. If fixture is attached to stand, go to step 2.
   b. (H) Position fixture (1) on stand (2) and aline screw holes. Rotate adapter (3) as necessary.
   c. Install six screws (4).
2. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (4) TO 130-150 ft-lb (18-21 mkg).



WARNING
Failure to properly secure the transmission can cause injury to personnel or damage to transmission.

3. REPAIRER AND HELPER INSTALL TRANSMISSION (5) ON TIP-OVER STAND (2) WITH FIXTURE (1).
   a. Using lifting device (6), position transmission (5) so six holes (7) on front of transmission aline with six holes (8) in fixture (1).
   b. (H) Install six screws (9).
4. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (9) TO 130-150 ft-lb (18-21 mkg).

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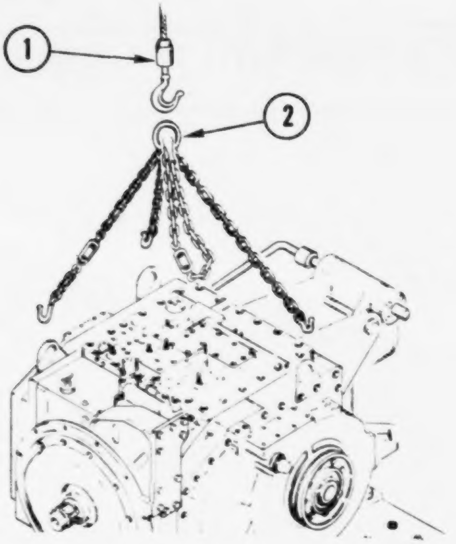
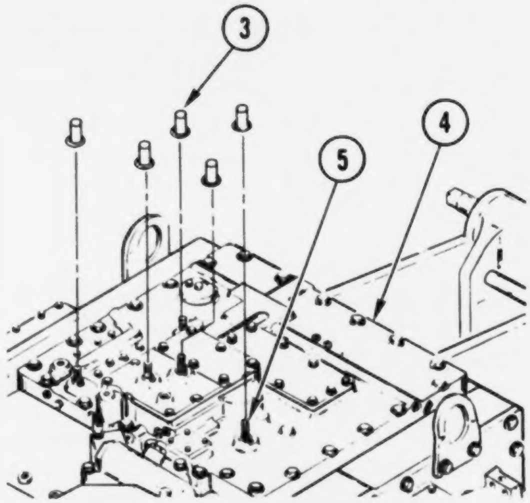
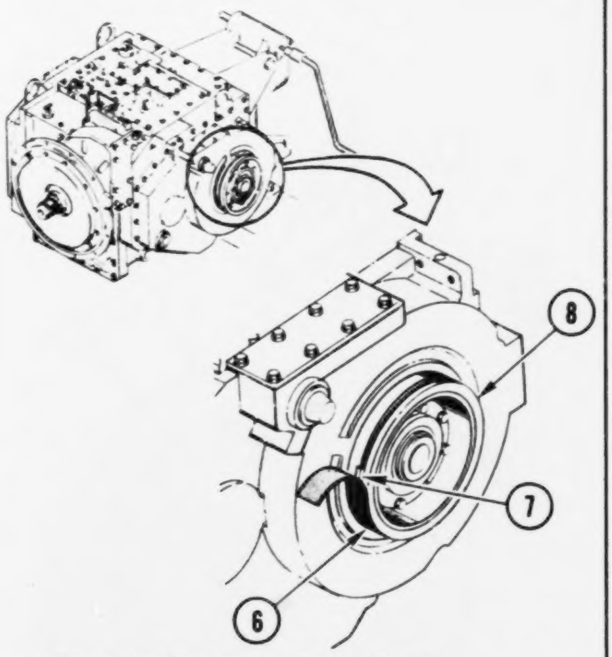


5. REPAIRER AND HELPER REMOVE LIFTING DEVICE (1) WITH SLING (2).

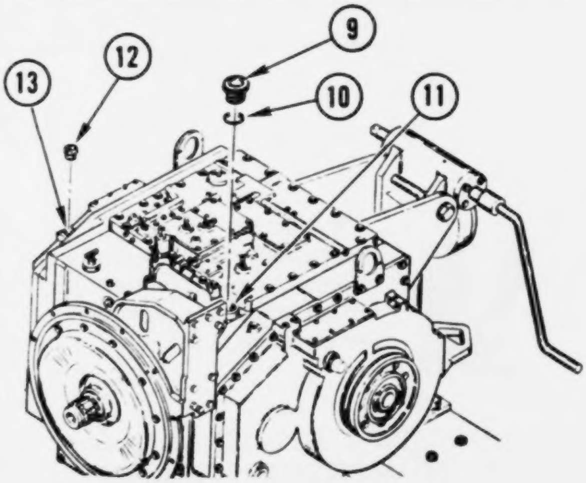
6. REPAIRER AND HELPER REMOVE SLING (2) FROM LIFTING DEVICE (1).



7. REMOVE FIVE PROTECTIVE CAPS (3) FROM CONTROLLER (4).
   a. Remove protective caps (3) from spline of five control shafts (5) on controller (4).

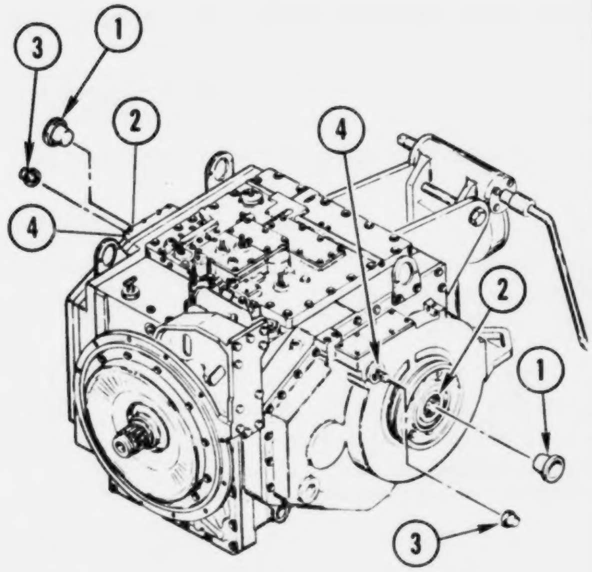


8. REMOVE TAPE (6) COVERING RETAINING RING (7) ON RIGHT TRUNNION (8). DISCARD TAPE.



9. REMOVE PROTECTIVE PLUG (9) AND PREFORMED PACKING (10).
   a. Unscrew plastic plug (9) and preformed packing (10) from transmission oil cooler outlet hose hole (11).

10. REMOVE CAP (12).
    a. Remove cap (12) from transmission oil breather filter hole (13).

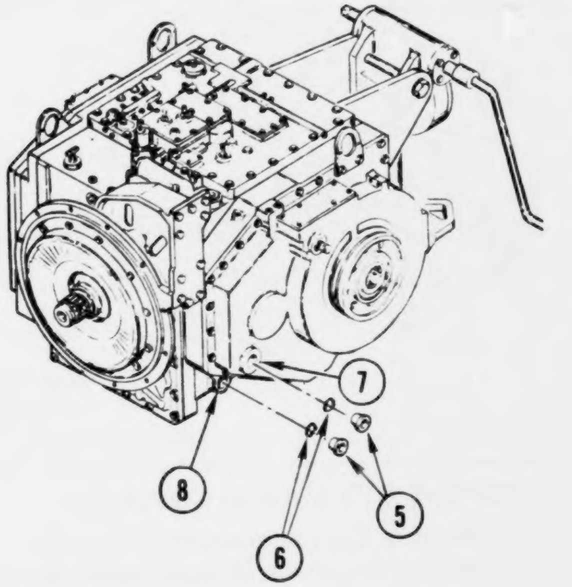


11. REMOVE TWO PROTECTIVE CAP PLUGS (1).

    a. Remove two plugs (1) from splined shafts (2) on each side of transmission.

12. REMOVE TWO PROTECTIVE CAPS (3).

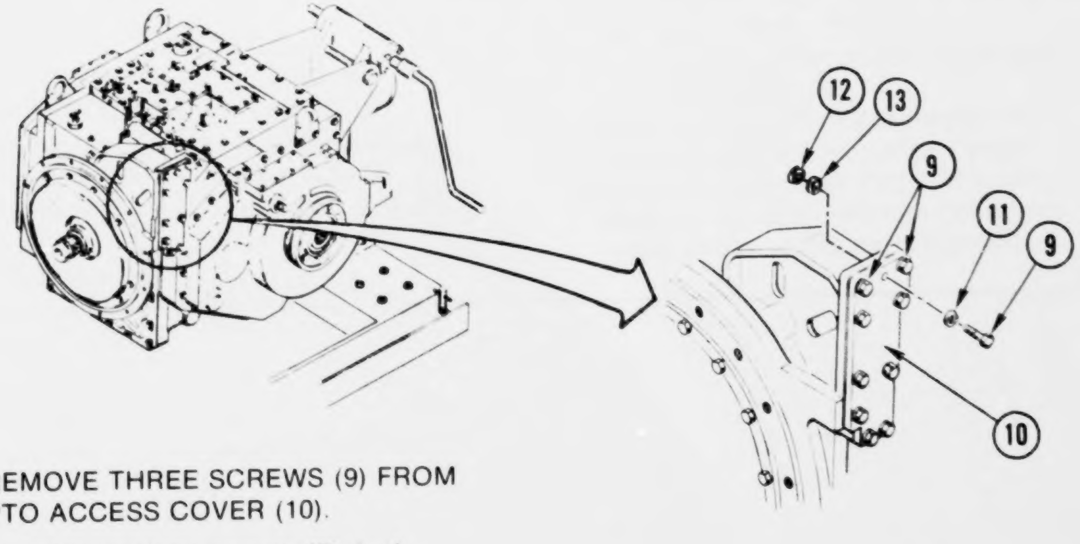
    a. Remove two protective caps (3) from two shouldered shafts (4).



13. REMOVE TWO PROTECTIVE PLUGS (5).

    a. Remove one plug (5) and preformed packing (6) from PTO drain line hole (7).

    b. Remove second plug (5) and preformed packing (6) from transmission oil cooler inlet hose hole (8).



14. REMOVE THREE SCREWS (9) FROM PTO ACCESS COVER (10).

    a. Remove three screws (9), lock washers (11), nuts (12), and washers (13).

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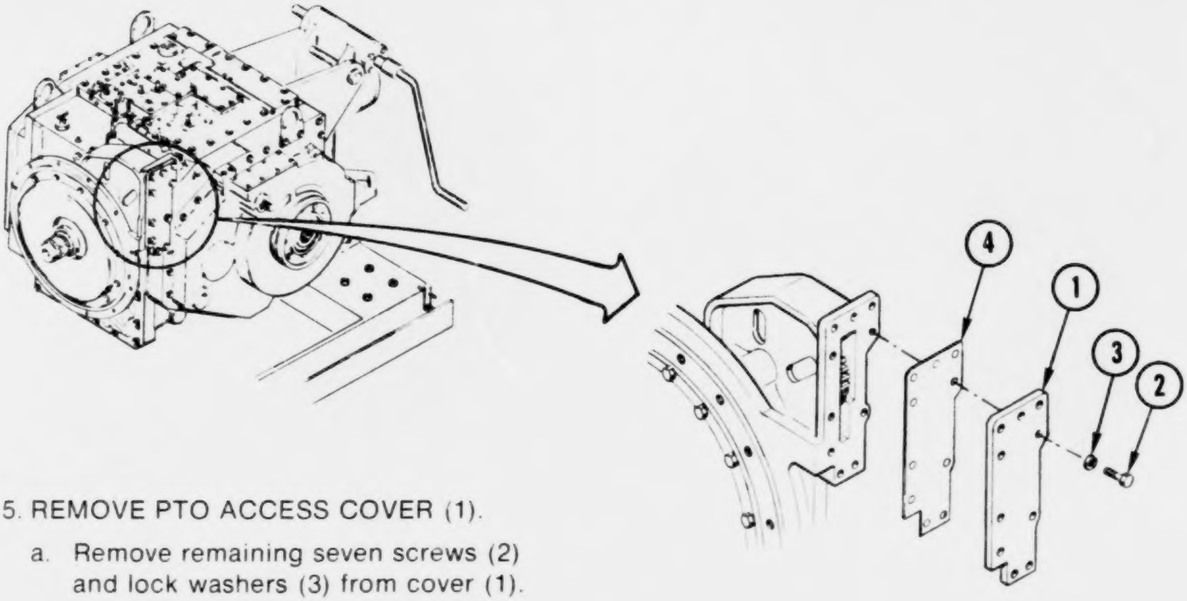

15. REMOVE PTO ACCESS COVER (1).

   a. Remove remaining seven screws (2) and lock washers (3) from cover (1).

   b. Remove cover (1) and gasket (4). Discard gasket.

   c. Put cover (1) in lower container.

END OF SUBTASK

END OF TASK

PREPARE TRANSMISSION FOR SHIPPING OR STORAGE

DESCRIPTION

This task covers the following subtasks:

Subtask — Page

Remove Transmission from Tip-over Stand and Tip-over Stand Fixture 2-153

Install Transmission in Shipping/Storage Container 2-159

It includes:

1. Preparation of the transmission for shipping or storage.
2. Removal of the transmission from the tip-over stand.
3. Installation of the transmission in the shipping/storage container.

INITIAL SETUP

Tools:

Funnel — (Item 32, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Lifting sling — (Item 44, App C)
Socket wrench attachment — (Item 84, App C)
Torque wrench — (Item 100, App C)
Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Dessicant unit (64) — (Item 3, App B)
Masking tape — (Item 6, App B)
Transmission oil — (Item 12, App B)
Gasket
PTO cover gasket

Materials/Parts: (cont)

Preformed packing
Shipping/storage container

Personnel Required:

Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.
Shipping/storage container separated into two halves
Upper container half positioned on blocks to protect mounting flange
Lower container half with container frame in place on resilient container frame and reusable parts removed

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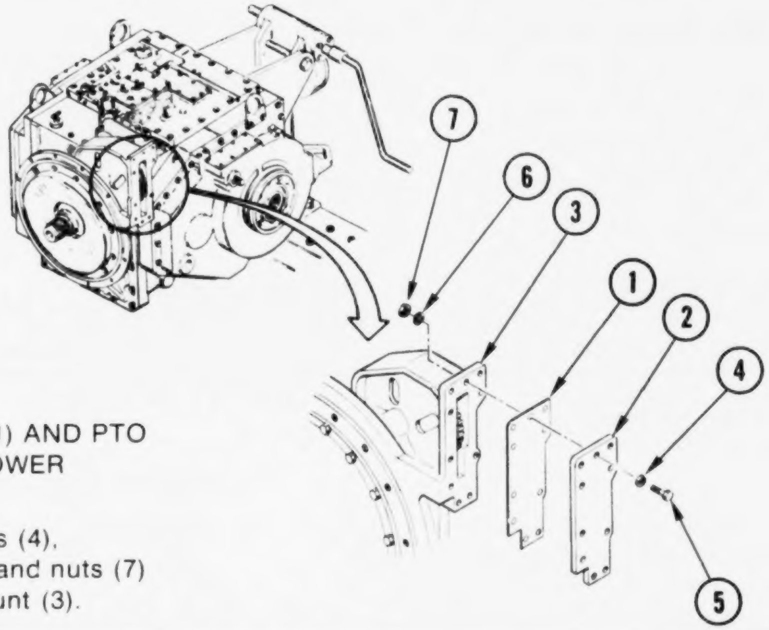
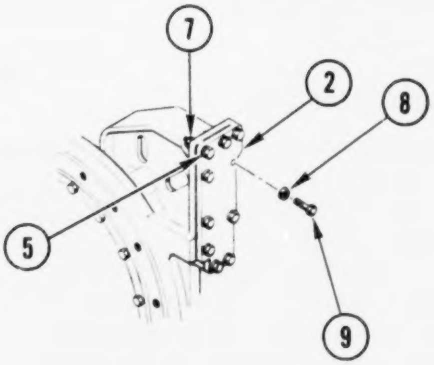
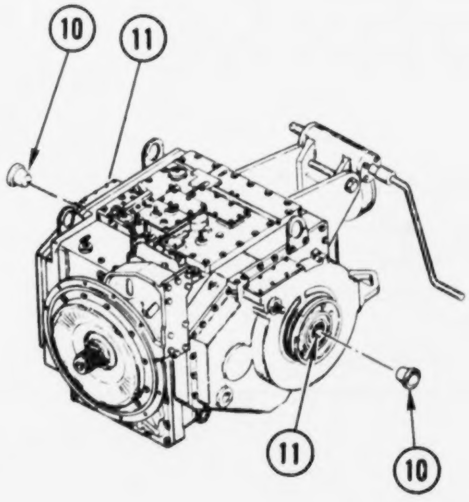
REMOVE TRANSMISSION FROM TIP-OVER STAND AND TIP-OVER STAND FIXTURE



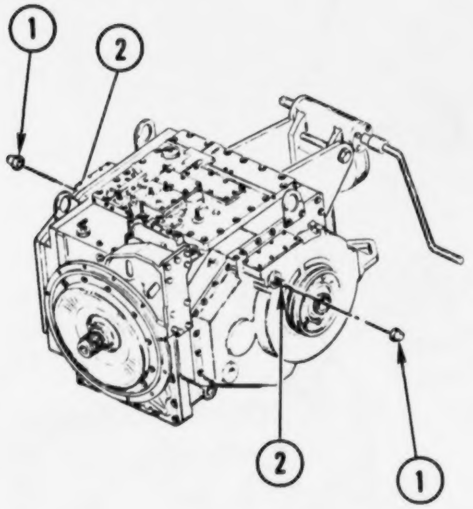
1. POSITION NEW GASKET (1) AND PTO ACCESS COVER (2) ON POWER TAKEOFF MOUNT (3).
   a. Install three lock washers (4), screws (5), washers (6), and nuts (7) in top three holes of mount (3).



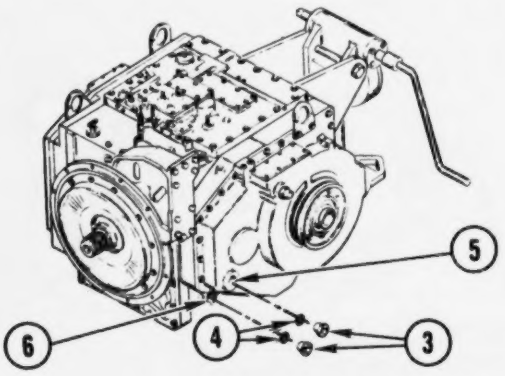
2. INSTALL COVER (2).
   a. Install seven lock washers (8) and screws (9).
3. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE THREE SCREWS (5) AND NUTS (7) TO 30-35 ft-lb (4-5 mkg).
4. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SEVEN SCREWS (9) TO 30-35 ft-lb (4-5 mkg).



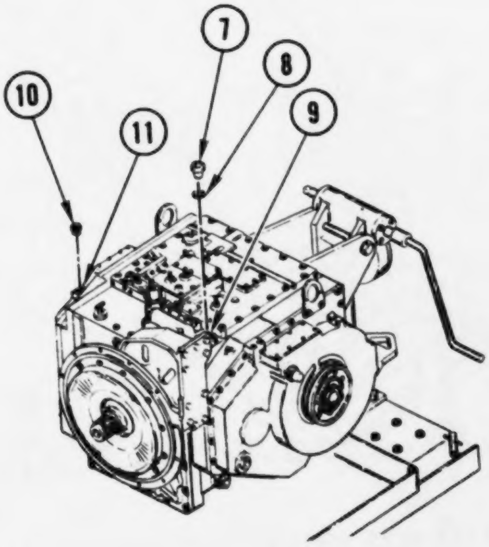
5. INSTALL TWO PROTECTIVE CAP PLUGS (10).
   a. Install one plug (10) on splined shafts (11) on each side of transmission.



6. INSTALL TWO PROTECTIVE CAPS (1).
   a. Install one protective cap (1) on shouldered shafts (2) on each side of transmission.



7. INSTALL TWO PROTECTIVE PLUGS (3).
   a. Coat two preformed packings (4) with transmission oil.
   b. Install one preformed packing (4) on each plug (3).
   c. Install plug (3) in PTO drain hole (5).
   d. Install plug (3) in transmission oil cooler inlet hose hole (6).



8. INSTALL PROTECTIVE PLUG (7).
   a. Coat preformed packing (8) with transmission oil.
   b. Install packing (8) on plug (7).
   c. Install plug (7) in transmission oil cooler outlet hose hole (9).

9. INSTALL CAP (10).
   a. Install cap (10) in transmission oil breather filter hole (11).

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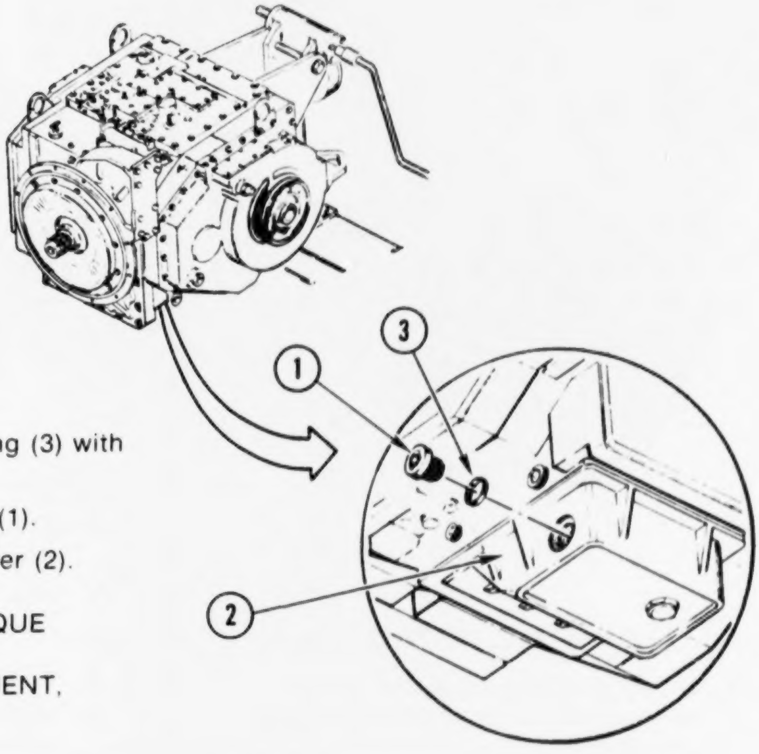


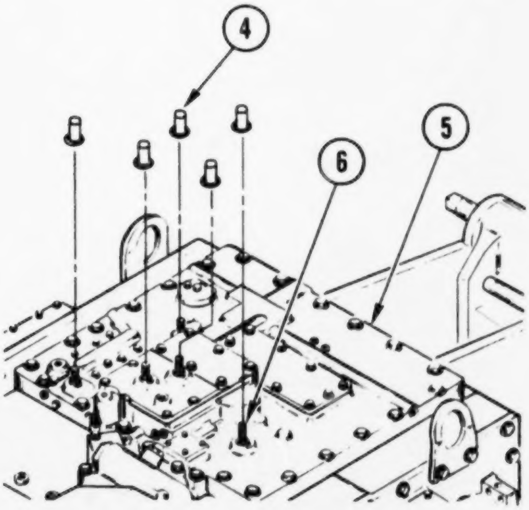
10. INSTALL PLUG (1) IN SUMP COVER (2) IF REMOVED.

    a. Coat new preformed packing (3) with transmission oil.

    b. Install packing (3) on plug (1).

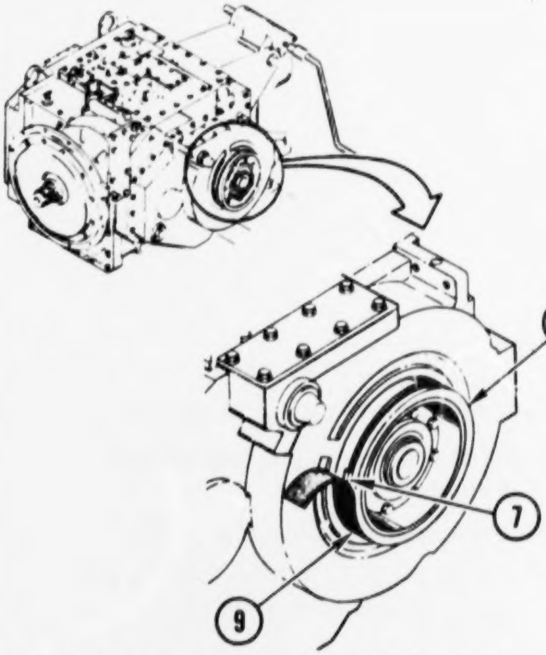
    c. Install plug (1) in sump cover (2).

11. USING 1/2-INCH DRIVE TORQUE WRENCH AND 5/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 100-110 ft-lb (14-15 mkg).

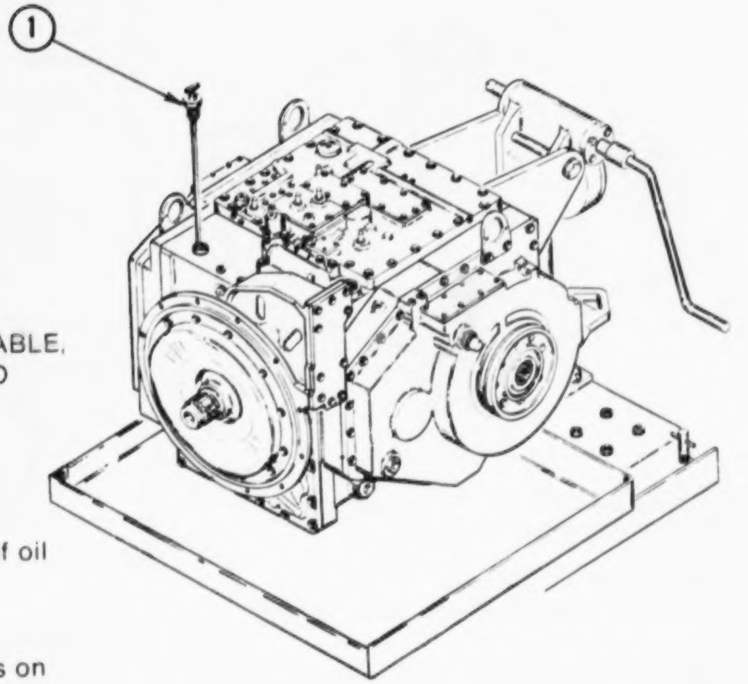


12. INSTALL FIVE PROTECTIVE CAPS (4) ON CONTROLLER (5).

    a. Install protective caps (4) on splines of five controller shafts (6) on controller (5).

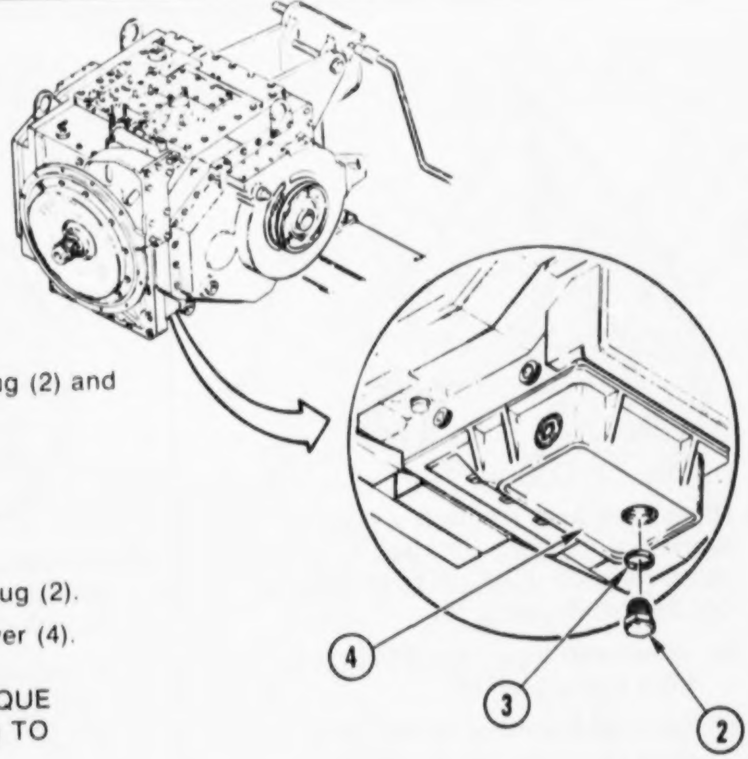


13. COVER RETAINING RING (7) ON RIGHT TRUNNION (8) WITH TAPE (9).



14. IF TRANSMISSION IS SERVICEABLE, GO TO STEP 15. IF NOT, GO TO STEP 19.

15. LUBRICATE TRANSMISSION.
    a. Remove dipstick (1).
    b. Using funnel, add 2 gallons of oil to transmission.
    c. Install dipstick (1).
    d. Rotate transmission 4-5 times on stand.



16. DRAIN OIL.
    a. Remove machine thread plug (2) and gasket (3). Discard gasket.
    b. Drain oil into oil pan.

17. INSTALL PLUG (2) IN SUMP COVER (4).
    a. Install new gasket (3) on plug (2).
    b. Install plug (2) in sump cover (4).

18. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE PLUG (2) TO 55-60 ft-lb (8 mkg).

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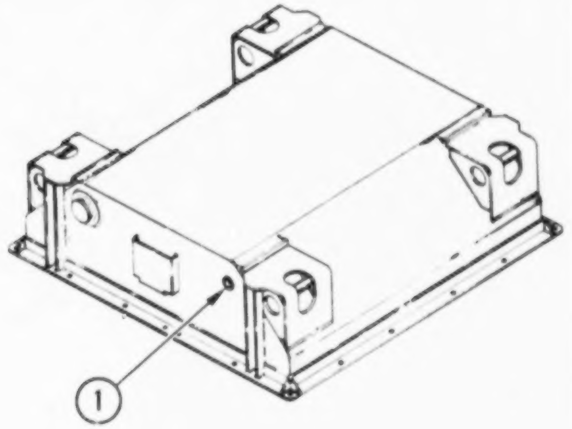
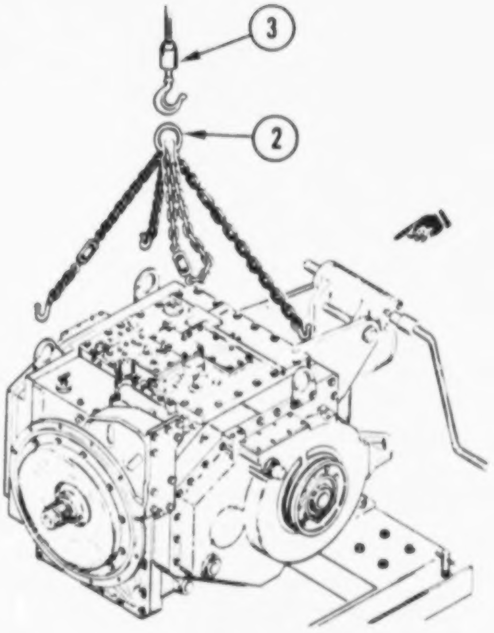
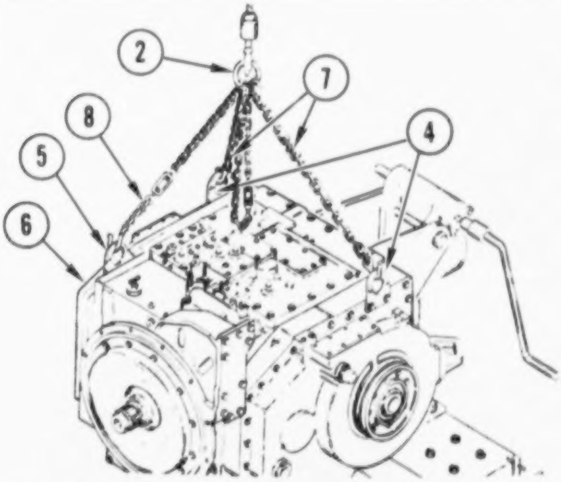


19. INSPECT COLOR OF HUMIDITY INDICATOR (1).
    a. If humidity indicator (1) is pink, go to step 20. If not, go to step 21.

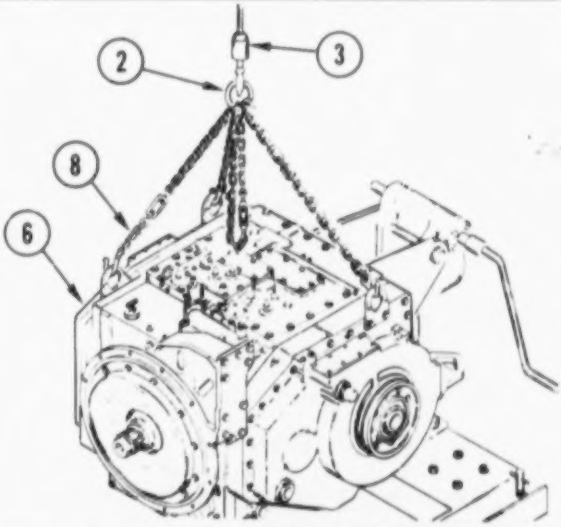
20. REPAIR SHIPPING/STORAGE CONTAINER, page 4-526.



21. ATTACH LIFTING SLING (2).
    a. Attach lifting sling (2) to lifting device (3).



22. REPAIRER AND HELPER ATTACH SLING (2) TO TWO LIFTING EYES (4) AND ONE LIFTING EYE (5) ON TRANSMISSION (6).
    a. Attach two legs (7) of sling (2) to front lifting eyes (4).
    b. (H) Attach turnbuckle leg (8) of sling (2) to rear lifting eye (5).



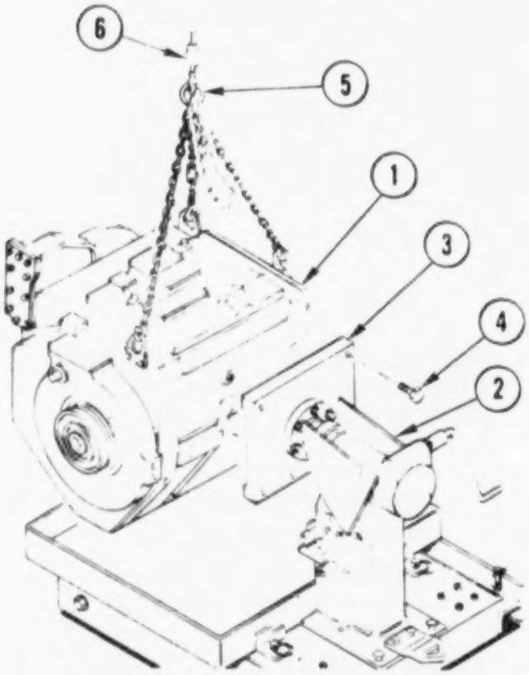
23. REPAIRER AND HELPER TRANSFER WEIGHT OF TRANSMISSION (6) TO SLING (2) AND LIFTING DEVICE (3).
    a. Adjust length of turnbuckle leg (8) if necessary.
    b. (H) Raise lifting device (3) until sling (2) is tight.

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

24. REPAIRER AND HELPER REMOVE TRANSMISSION (1) FROM TIP-OVER STAND (2) AND TIP-OVER STAND FIXTURE (3).
    a. Remove six screws (4) from fixture (3).
    b. Support transmission (1) with sling (5) and lifting device (6). Separate transmission from stand (2) and fixture (3).

25. INSPECT MAIN HOUSING INSERTS.
    a. Inspect assembly hardware and inserts. See page 2-5.
    b. Repair inserts, if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

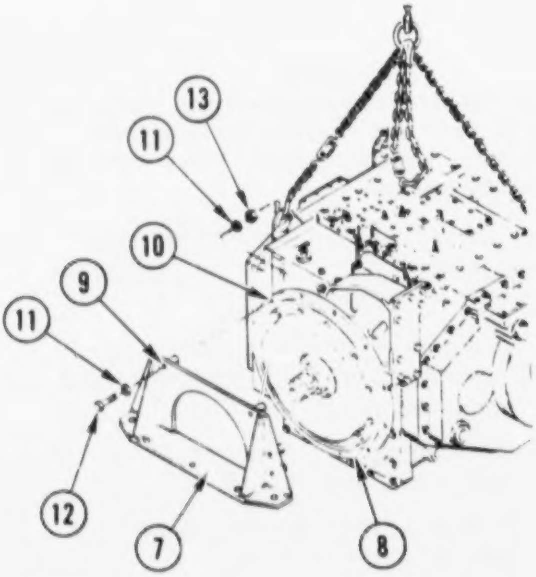


END OF SUBTASK

INSTALL TRANSMISSION IN SHIPPING/STORAGE CONTAINER

1. INSTALL REAR TRANSMISSION CONTAINER MOUNT (7) ON MOUNTING FLANGE (8).
    a. (H) Aline six holes (9) in rear mount (7) with six holes (10) in input flange (8).
    b. Install 12 washers (11), 6 screws (12), and self-locking nuts (13).

2. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (12) TO 40-45 ft-lb (6 mkg).



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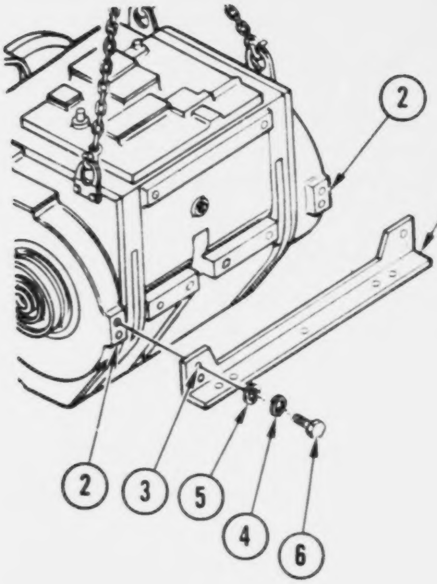
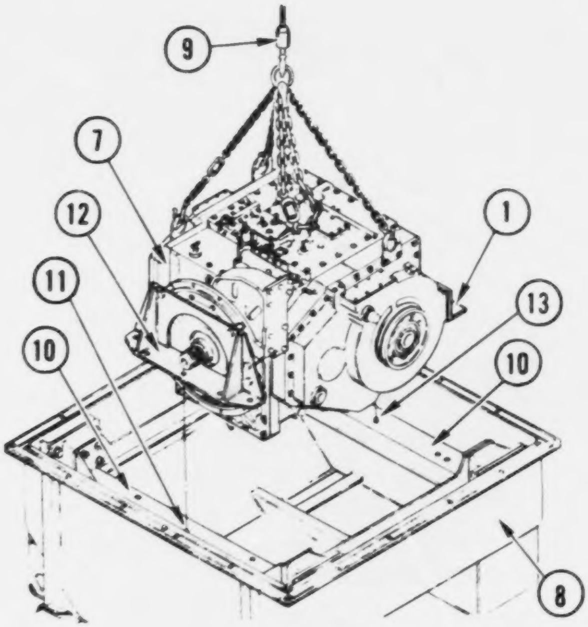


3. INSTALL FRONT TRANSMISSION CONTAINER MOUNT (1) ON TWO OUTPUT HOUSINGS (2).
   a. (H) Aline four holes (3) in front mount (1) with four holes in output housings (2).
   b. Install four lock washers (4), washers (5), and screws (6).
4. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE FOUR SCREWS (6) TO 55-60 ft-lb (8 mkg).



NOTE

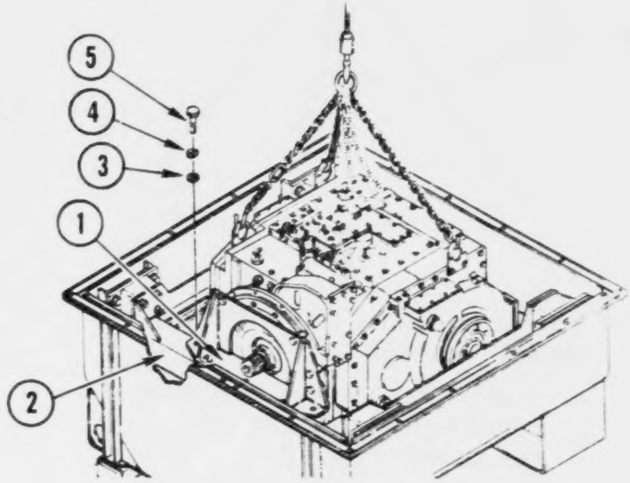
The container has two alinement pins. They aline holes in front and rear mounts with holes in transmission container frame. Holes will aline only in one position.

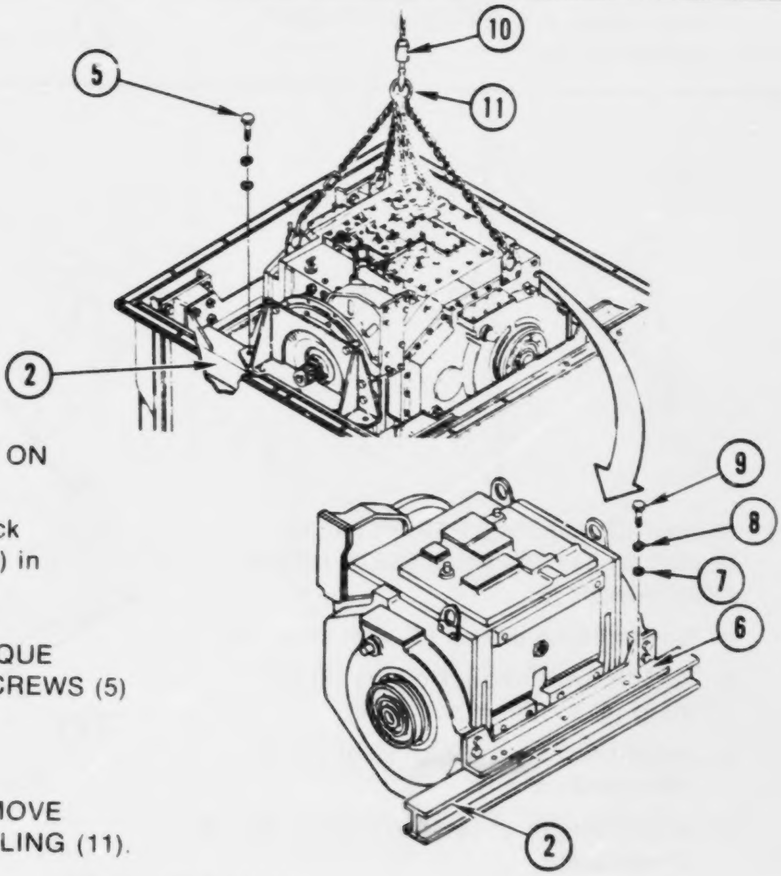
5. REPAIRER AND HELPER POSITION TRANSMISSION (7) IN TRANSMISSION LOWER CONTAINER (8).
   a. Using lifting device (9), lower transmission (7) onto transmission container frame (10).
   b. (H) Aline pin (11) in frame (10) with hole in rear mount (12).
   c. Aline pin (13) in frame (10) with hole in front mount (1).

WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

NOTE
If may be necessary to slightly raise or lower transmission in order to install screws.

6. INSTALL REAR MOUNT (1) ON FRAME (2).
   a. Install four washers (3), lock washers (4), and screws (5) in rear mount (1).



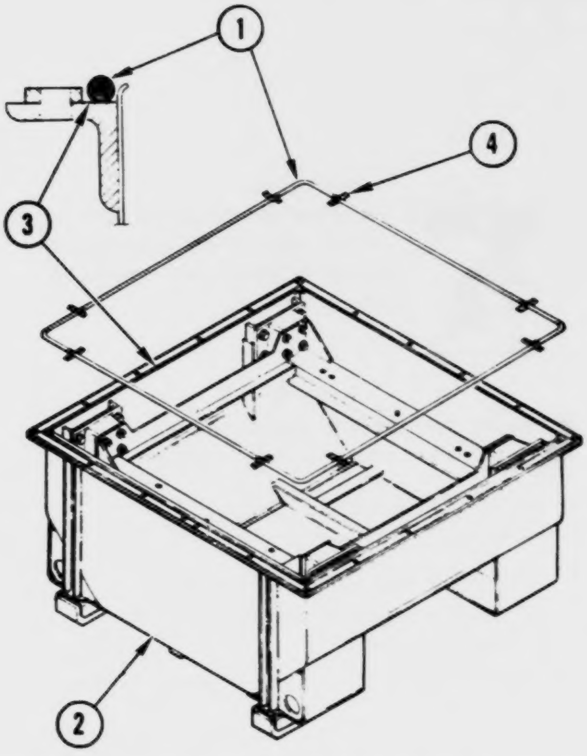


7. INSTALL FRONT MOUNT (6) ON FRAME (2).
   a. Install four washers (7), lock washers (8), and screws (9) in front mount (6).

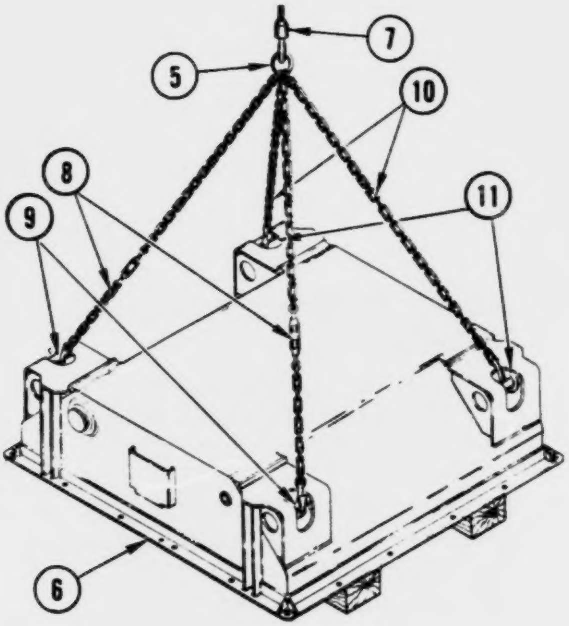
8. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE FOUR SCREWS (5) AND FOUR SCREWS (9) TO 125-135 ft-lb (17-19 mkg).

9. REPAIRER AND HELPER REMOVE LIFTING DEVICE (10) WITH SLING (11).

GO TO NEXT PAGE



10. INSTALL GASKET (1) ON TRANSMISSION LOWER CONTAINER (2).
    - a. If gasket (1) has been discarded, obtain new gasket. If not, use old gasket.
    - b. Position gasket (1) on lower container (2) in lip (3) of mounting flange.
    - c. Install new tape (4) on gasket (1) in two places at each corner of lower container (2).



11. REPAIRER AND HELPER ATTACH SLING (5) TO TRANSMISSION UPPER CONTAINER (6).
    - a. Lower lifting device (7) with sling (5).
    - b. Attach two turnbuckle legs (8) of sling (5) to lifting points (9).
    - c. Attach two legs (10) of sling (5) to lifting points (11).
    - d. Adjust length of two turnbuckle legs (8), if necessary.

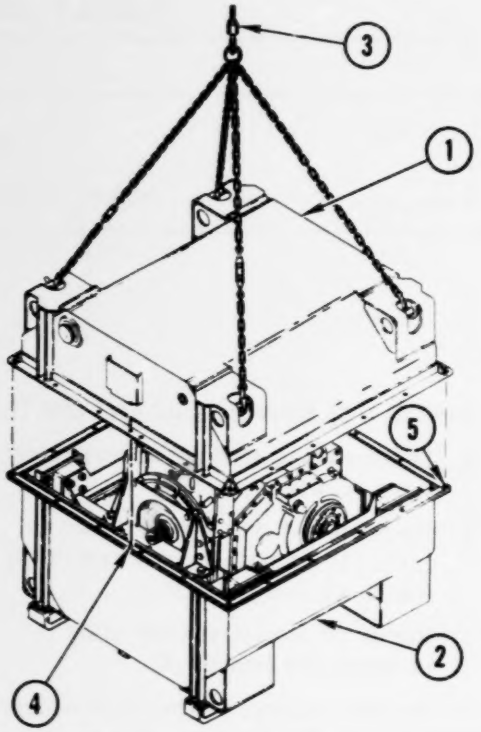
WARNING

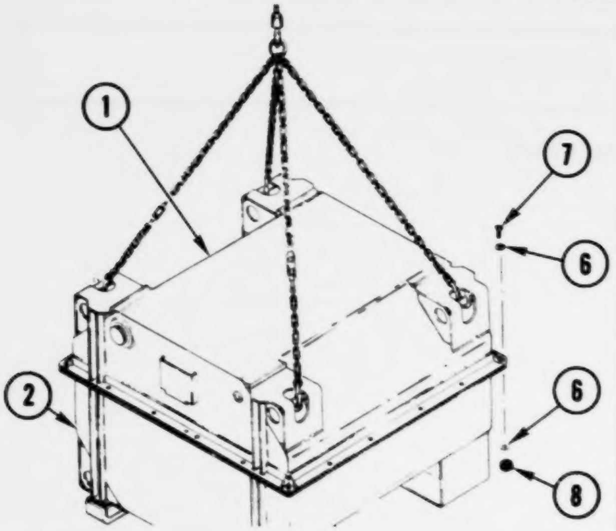
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

NOTE

The lower container has one dowel pin to help aline screw holes in the two container halves. The upper half of container will go on only in one direction.

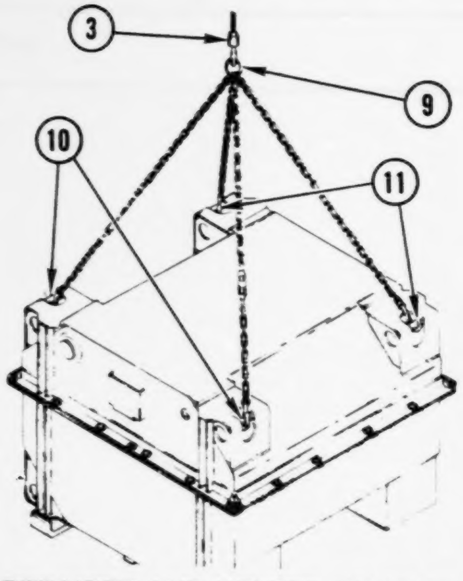
12. REPAIRER AND HELPER POSITION UPPER CONTAINER (1) ON LOWER CONTAINER (2).
    a. Using lifting device (3), position upper container (1) over lower container (2).
    b. (H) Aline pin (4) in lower container (2) with hole in upper container (1).
    c. Using lifting device (3) place upper container (1) onto lower container (2) and aline 20 holes (5).





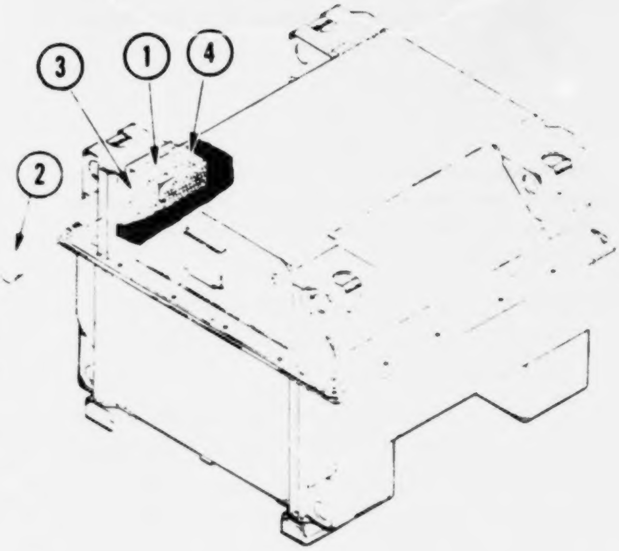
13. SECURE UPPER CONTAINER (1) TO LOWER CONTAINER (2).
    a. Install 20 washers (6), screws (7), washers (6), and self-locking nuts (8).

14. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 20 SCREWS (7) AND NUTS (8) TO 55-60 ft-lb (8 mkg).



15. REPAIRER AND HELPER REMOVE LIFTING DEVICE (3) AND SLING (9).
    a. Remove sling (9) from lifting points (10) and (11).
    b. Remove sling (9) from lifting device (3).

GO TO NEXT PAGE



16. INSTALL 64 NEW DESSICANT UNITS (1)

  a. Unscrew and remove access cover (2) from access port (3).

  b. Remove and discard all dessicant units (1) from dessicant basket (4) inside access port (3).

  c. Install 64 new dessicant units (1) in dessicant basket (4).

  d. Replace access cover (2) in access port (3). Tighten cover.

END OF SUBTASK

END OF TASK

Section VI. SPECIAL TASKS

TASK INDEX

Task	Page	Task	Page
Replace Helical Coil Inserts	2-166	Replace Inserts	2-171

REPLACE HELICAL COIL INSERTS

DESCRIPTION

This task gives procedures for removal and installation of helical coil inserts. Part or item numbers of tools, kits and inserts, and working dimensions are tabulated in appropriate tasks in chapter 4. See Insert Repair tasks for assembly or housing needing repair.

INITIAL SETUP

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Equipment on workbench

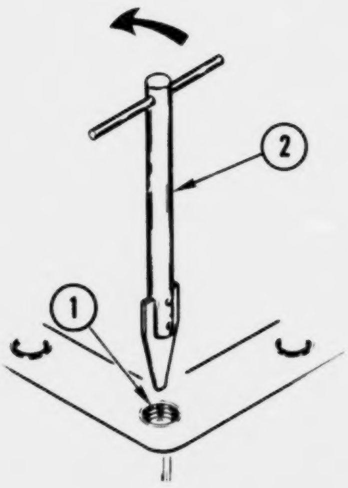
REMOVE

CAUTION

Do not damage threads of tapped hole when using extraction tool.

Remove inserts from end of tapped hole that the insert is closest to. Threads in tapped hole can be damaged.

1. REMOVE INSERT (1).
   a. Place extraction tool (2) in insert (1). See task for proper extraction tool. Tap top of extraction tool (2).
   b. Maintaining a steady downward pressure, turn tool (2) to the left. Remove insert (1).
   c. If insert (1) does not come out of tapped hole, go to step 2. If insert (1) does come out of tapped hole, go to step 4.



2. (DELETED)

3. (DELETED)

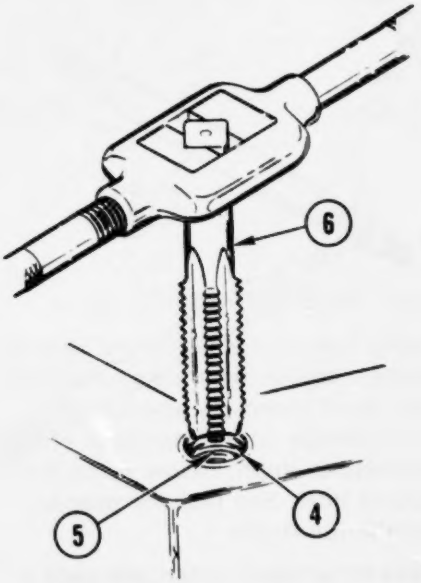
WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

4. CLEAN THREADS (5).
   a. Lubricate finishing tap (6) with transmission oil.
   b. Using tap (6) and tap handle, slowly thread tap in and out of threads (5). See task for proper tap.
   c. Using compressed air, blow out dirt and any loose metal chips in threads (5).
   d. Use wiping rag dampened with cleaning solvent to clean hole (4).

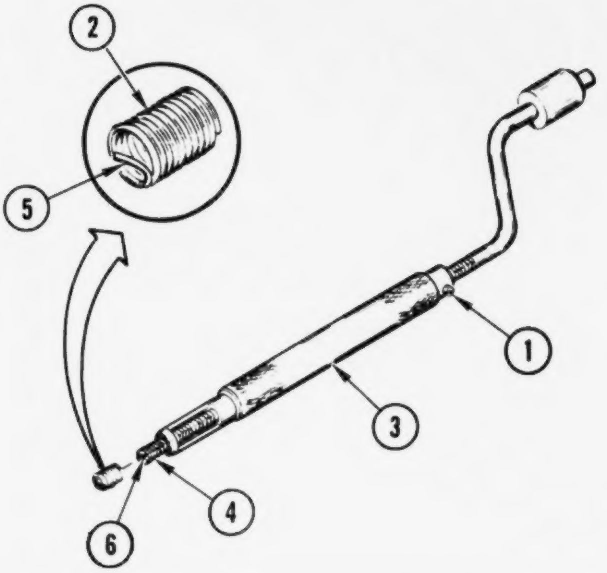


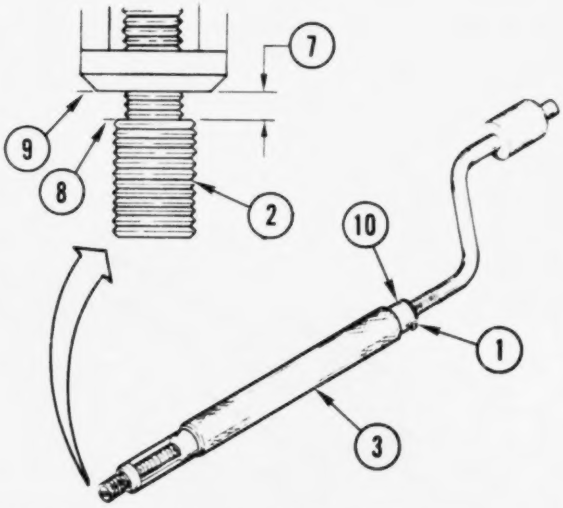
GO TO NEXT PAGE

INSTALL

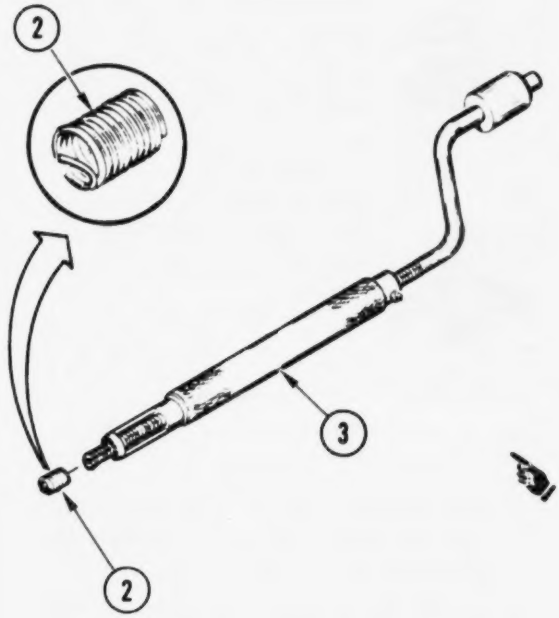
5. LOOSEN SETSCREW (1).

6. INSTALL NEW INSERT (2) ON INSERTION TOOL (3). See task for proper insert.
   a. Turn handle until shaft (4) extends past tip of insertion tool (3) slightly longer than length of insert (2).
   b. Screw new insert (2) on shaft (4) until tang (5) of insert goes into shaft notch (6).

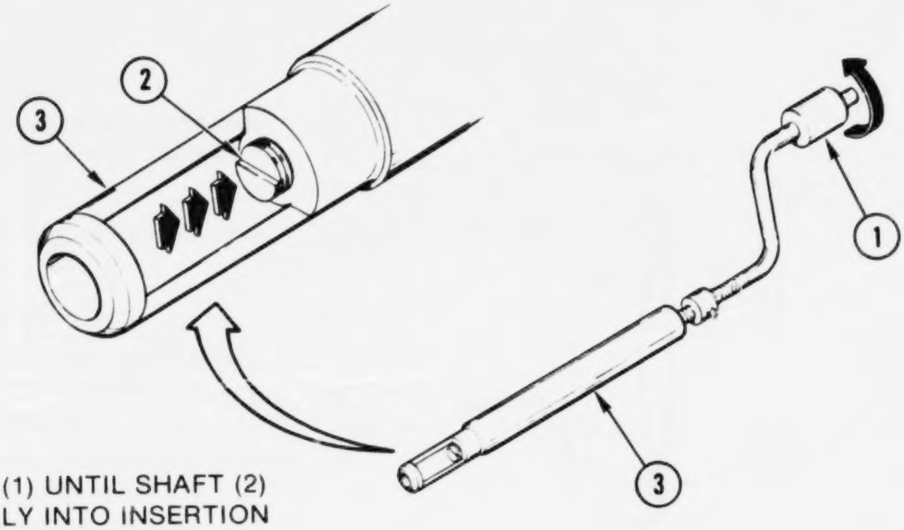




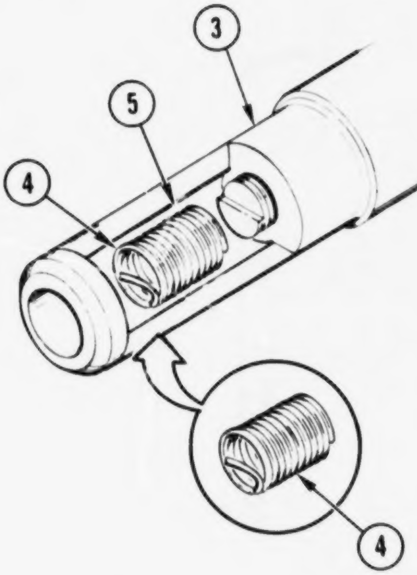
7. ADJUST INSERTION TOOL (3).
   a. Using insertion tool (3) and indicator caliper, adjust distance (7) between end (8) of insert (2) and tip (9). Turn handle until distance is equal to installation depth below surface of tapped hole. See task for proper installation depth.
   b. Push down stop collar (10) until it contacts body of insertion tool (3).
   c. Tighten setscrew (1).



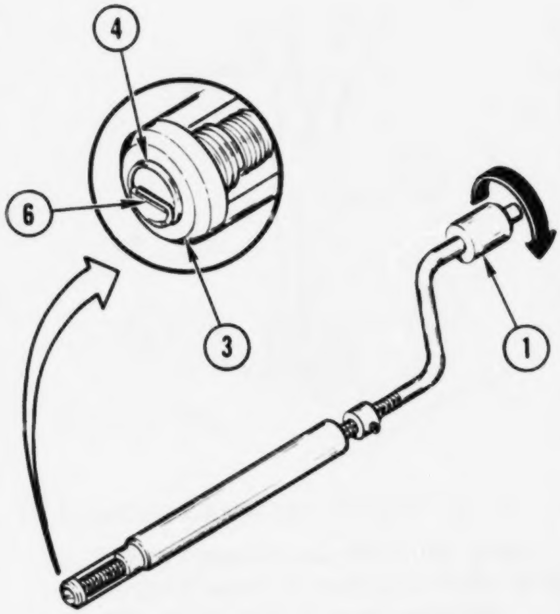
8. REMOVE INSERT (2) FROM INSERTION TOOL (3).



8.1 TURN HANDLE (1) UNTIL SHAFT (2) RETRACTS FULLY INTO INSERTION TOOL (3).



8.2 PLACE INSERT (4) IN OPENING (5) OF INSERTION TOOL (3).



8.3 TURN HANDLE (1) UNTIL TANG (6) OF INSERT (4) IS EVEN WITH TIP OF INSERTION TOOL (3).

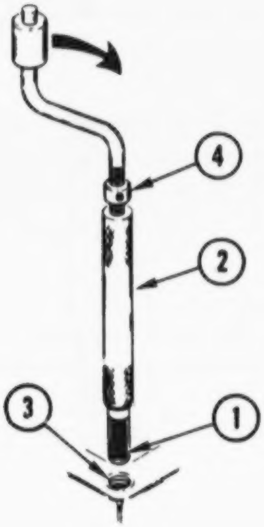
GO TO NEXT PAGE

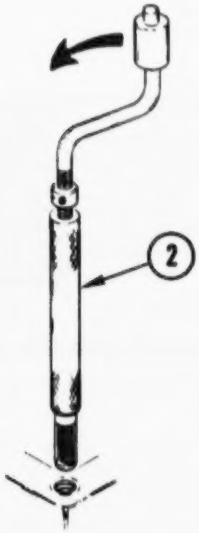
CAUTION

Insertion tool must be straight and not allowed to wobble when installing insert. Equipment can be damaged.

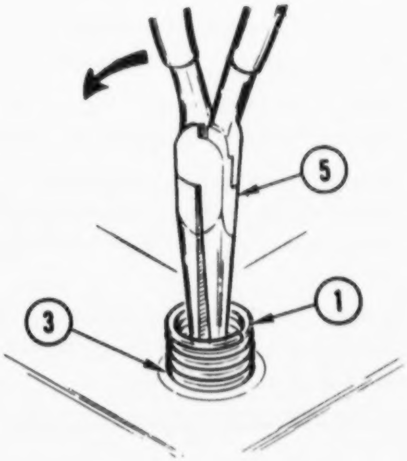
Do not force insert into tapped hole. Threads will be damaged.

9. INSTALL NEW INSERT (1).
   - a. Put tip of insertion tool (2) against tapped hole (3) being sure that insertion tool is straight.
   - b. Slowly turn handle of insertion tool (2) to the right until stop collar (4) contacts body of insertion tool.
   - c. If insert (1) does not go into tapped hole (3) easily, go to step 10. If insert (1) does go into tapped hole (3) easily, go to step 13.





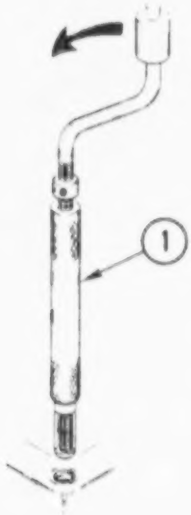
10. REMOVE INSERTION TOOL (2).
    - a. Turn handle of insertion tool (2) to the left until insertion tool can be removed.



11. REMOVE DAMAGED INSERT (1).
    - a. Using needle nose pliers (5), grasp tang of insert (1) and turn insert to the left until it can be removed from tapped hole (3).
    - b. Remove and discard damaged insert (1).

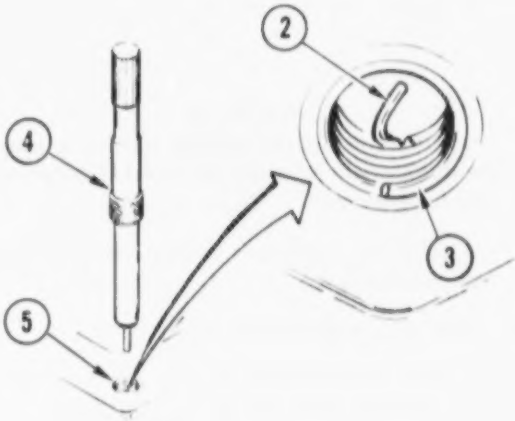
12. GO TO STEP 4.

GO TO NEXT PAGE



13. REMOVE INSERTION TOOL (1).

    a. Turn handle of insertion tool (1) to the left until insertion tool can be removed.



14. REMOVE TANG (2) FROM INSERT (3).

    a. Place tang breakoff tool (4) in tapped hole (5) with installed insert (3). See task for proper breakoff tool.

    b. Push down end of breakoff tool (4) until tang (2) breaks off of insert (3).

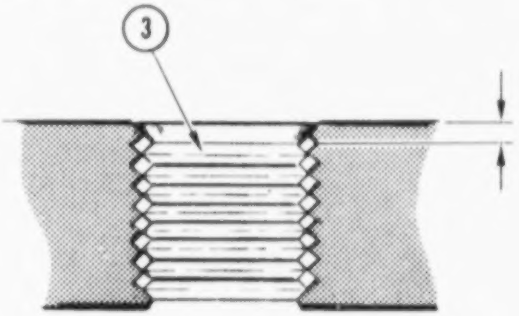
    c. If tapped hole (5) is a blind hole, remove and discard tang.

15. INSPECT INSTALLED INSERT (3).

    a. Check that threads of insert (3) are not twisted, cracked, or stripped.

    b. Using depth gage, check that insert (3) is at its correct depth below surface. See task for correct depth.

    c. If new insert (3) was damaged during installation, or installation depth is not correct, go to step 1.



END OF TASK

REPLACE INSERTS

DESCRIPTION

This task gives procedures for removal and installation of inserts. Part numbers of tools, kits and inserts, and working dimensions are tabulated in appropriate tasks in chapter 4. See Insert Repair task for assembly or housing needing repair. This task contains the following subtasks:

Subtask	Page
Replace Standard and Oversize Inserts	2-172
Replace Lockring Insert	2-176

INITIAL SETUP

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Equipment on workbench

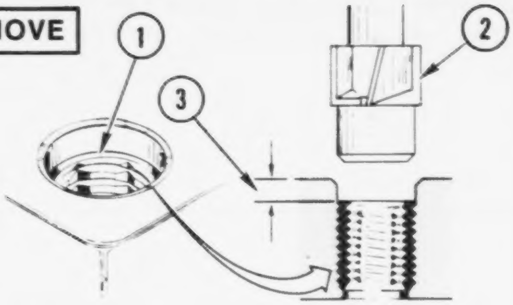
GO TO NEXT PAGE

REPLACE STANDARD AND OVERSIZE INSERTS

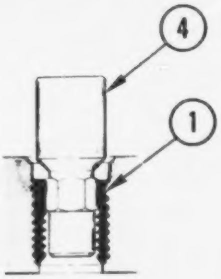
DESCRIPTION

This subtask covers: Remove (page 2-172). Install (page 2-173).

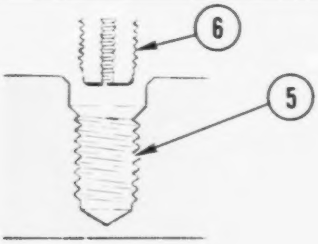
REMOVE



1. COUNTERBORE INSERT (1).
   a. Using portable electric drill, indicator caliper, and removal tool (2), drill out top of insert (1) to existing counterbore depth (3). See task for proper removal tool.

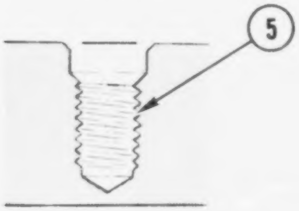


2. REMOVE INSERT (1).
   a. Insert drive wrench (4) into insert (1). See task for proper drive wrench.
   b. Using ratchet handle and drive wrench, unscrew insert (1).



WARNING
Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

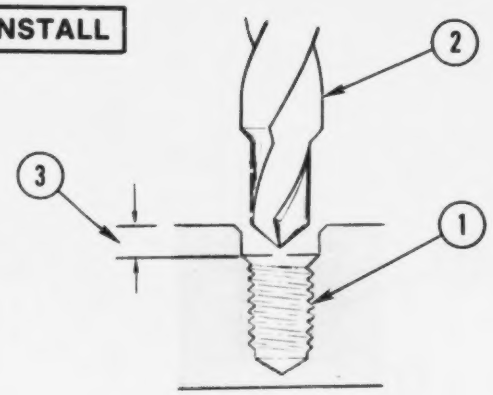
3. CLEAN HOUSING THREADS (5).
   a. Lubricate thread cutting tap (6) with transmission oil.
   b. Using tap wrench and thread cutting tap (6), clean housing threads (5). Slowly turn tap in and out of housing threads. See task for proper tap.
   c. Using compressed air, blow dirt and any loose metal chips out of housing threads (5).



4. INSPECT HOUSING THREADS (5) FOR WEAR OR STRIPPING.

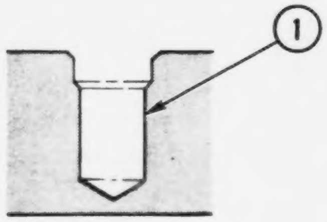
5. IF HOUSING THREADS (5) ARE DAMAGED, INSTALL OVERSIZE INSERT (see task for proper insert). GO TO STEP 6. IF HOUSING THREADS (5) ARE NOT DAMAGED, INSTALL STANDARD INSERT (see task for proper insert). GO TO STEP 13.

INSTALL



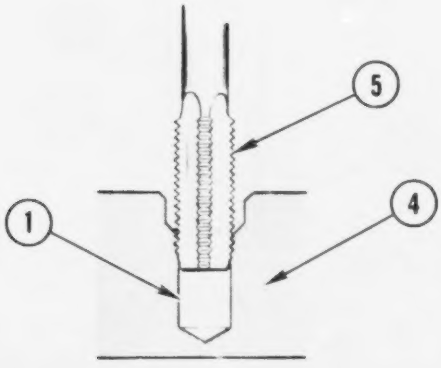
CAUTION
Do not bore tapped hole deeper than installation depth shown in insert replacement task. Damage to equipment can occur.

6. BORE OUT TAPPED HOLE (1).
   a. Using portable electric drill, indicator caliper, and step drill (2) for oversize inserts, bore tapped hole (1) to counterbore depth (3). See task for proper step drill and counterbore depth.

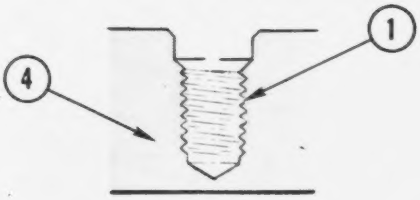


WARNING
Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

7. CLEAN BORED HOLE (1).
   a. Using compressed air, blow out metal chips.



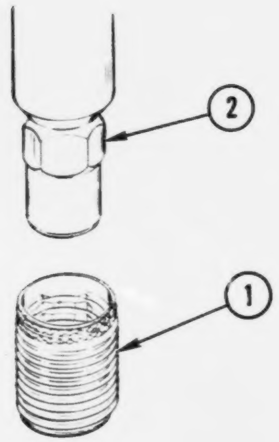
8. TAP BORED HOLE (1) IN HOUSING (4).
   a. Coat thread cutting tap (5) for oversize insert with transmission oil. See task for proper thread cutting tap.
   b. Using tap wrench and tap (5), cut threads until tap bottoms.



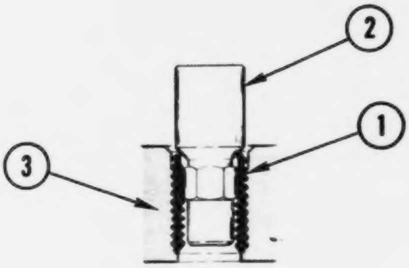
WARNING
Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

9. CLEAN NEWLY TAPPED HOLE (1) IN HOUSING (4).
   a. Using compressed air, blow out metal chips.

GO TO NEXT PAGE

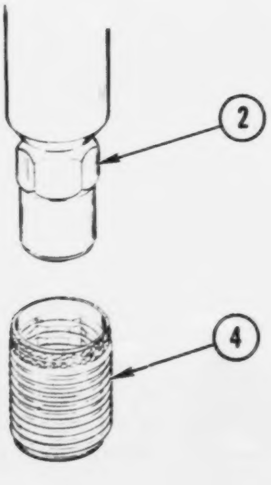


10. PUT NEW OVERSIZE INSERT (1) ON DRIVE WRENCH (2). See task for proper oversize insert and drive wrench.

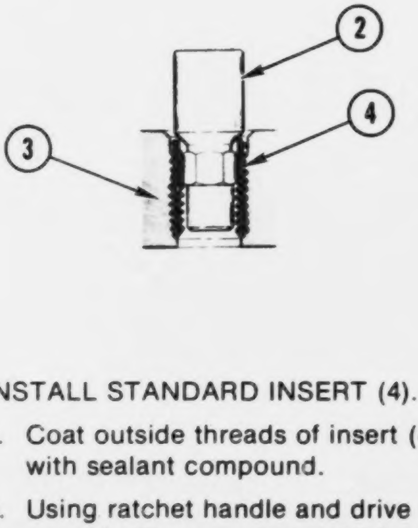


11. INSTALL OVERSIZE INSERT (1).
    a. Coat outside threads of insert (1) with sealant compound.
    b. Using ratchet handle and drive wrench (2), screw insert (1) into threaded hole in housing (3). See tas for proper installation depth.

12. GO TO STEP 16.

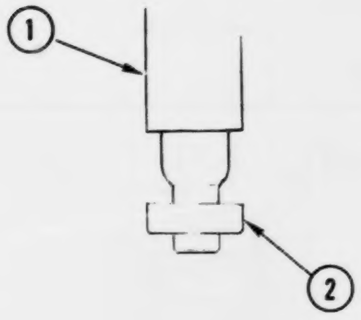


13. PUT NEW STANDARD INSERT (4) ON DRIVE WRENCH (2). See task for proper standard insert and drive wrench.

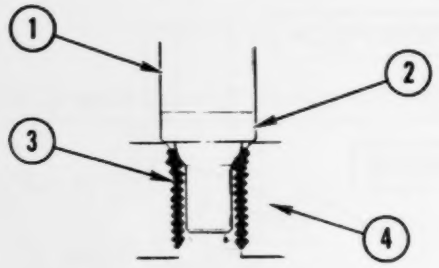


14. INSTALL STANDARD INSERT (4).
    a. Coat outside threads of insert (4) with sealant compound.
    b. Using ratchet handle and drive wrench (2), screw insert (4) into threaded hole in housing (3). See task for proper installation depth.

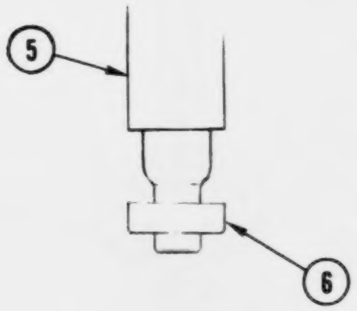
15. GO TO STEP 18.



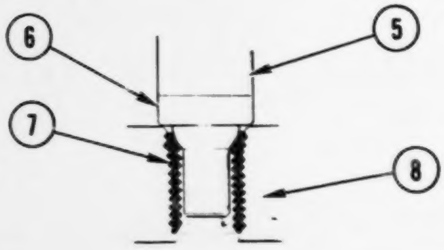
16. PREPARE OVERSIZE INSERT SWAGE TOOL (1).
    a. See task for proper oversize insert swage tool (1).
    b. See task for proper swage tool stop (2).
    c. Install swage tool stop (2) on swage tool (1).



17. LOCK INSERT (3) IN PLACE.
    a. Put swage tool (1) into insert (3).
    b. Using hammer, strike top of swage tool (1) until swage tool stop (2) bottoms on housing (4). Remove tool.
    c. Inspect new insert (3) for damage during installation. If damaged, go to step 1. If not, go to step 20.



18. PREPARE STANDARD INSERT SWAGE TOOL (5).
    a. See task for proper standard insert swage tool (5).
    b. See task for proper swage tool stop (6).
    c. Install swage tool stop (6) on swage tool (5).



19. LOCK INSERT (7) IN PLACE.
    a. Put swage tool (5) into insert (7).
    b. Using hammer, strike top of swage tool (5) until swage tool stop (6) bottoms on housing (8). Remove tool.
    c. Inspect new insert (7) for damage during installation. If damaged, go to step 1.

20. CLEAN ALL NEW INSERTS AND RELATED HOUSING.
    a. Clean assembly and hardware. See page 2-2.

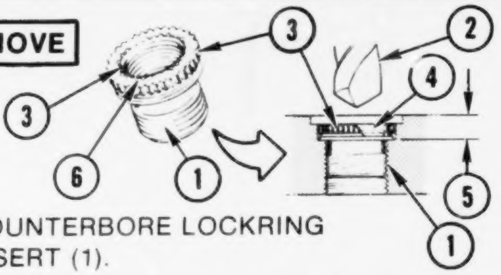
END OF SUBTASK

REPLACE LOCKRING INSERT

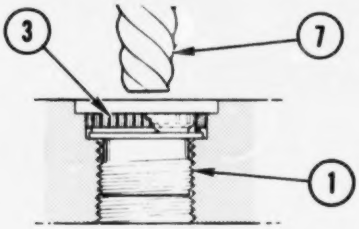
DESCRIPTION

This subtask covers: Remove (page 2-176). Install (page 2-177).

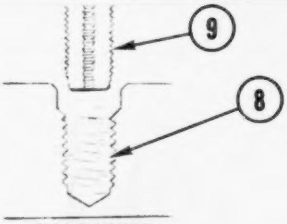
REMOVE



1. COUNTERBORE LOCKRING INSERT (1).
   a. Using portable electric drill, indicator caliper, and removal tool (2), drill through lockring (3) and neck of insert (4).
   b. Drill to existing counterbore depth (5).
   c. Remove all serration interlocks (6) on lockring (3) and neck of insert (4).



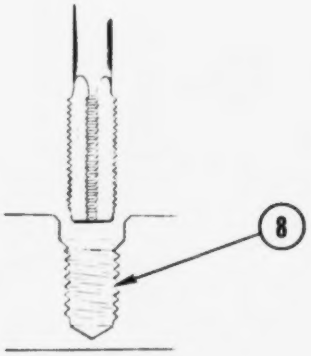
2. REMOVE INSERT (1) WITH LOCKRING (3).
   a. Drive screw extractor (7) through lockring (3) into insert (1).
   b. Using screw extractor (7), unscrew insert (1). Lockring (3) will be forced out with insert (1).



WARNING

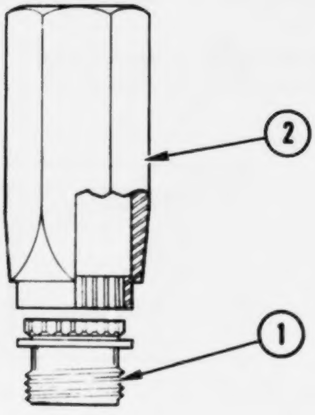
Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa). Always wear goggles.

3. CLEAN HOUSING THREADS (8).
   a. Lubricate thread cutting tap (9) with transmission oil.
   b. Using tap wrench and thread cutting tap (9), clean housing threads (8). Slowly turn tap in and out of housing threads. See task for proper tap.
   c. Using compressed air, blow dirt and any loose metal chips out of housing threads (8).

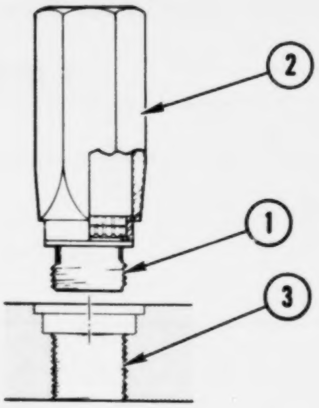


4. INSPECT HOUSING THREADS (8) FOR WEAR OR STRIPPING.
   a. If housing threads (8) are damaged, go to step 5. If not, go to step (6).
5. REPLACE OUTPUT HOUSING. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING TO DEPOT.

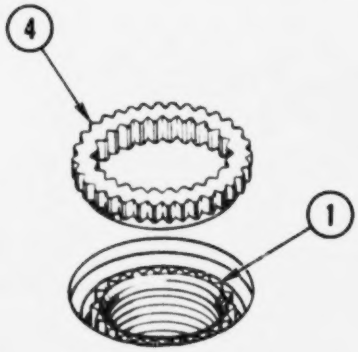
INSTALL



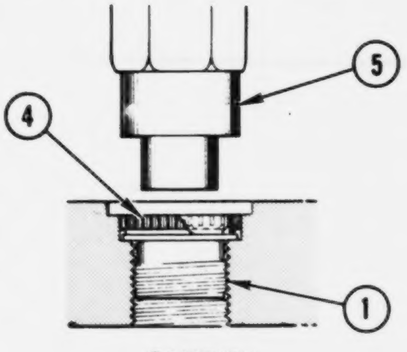
6. PUT NEW INSERT (1) ON DRIVE WRENCH (2). See task for proper insert and drive wrench.



7. INSTALL INSERT (1).
   a. Coat outside threads of insert (1) with sealant compound.
   b. Using drive wrench (2), screw insert (1) into housing threads (3). See task for proper installation depth.



8. POSITION NEW LOCKRING (4) ON INSERT (1).
   a. Aline serrations of insert (1) with serrations of lockring (4).

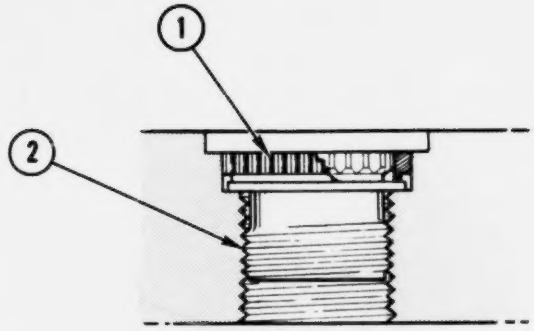


CAUTION

Do not allow drive tool to contact housing. Any impact of pressure on housing surface may damage housing threads. Damage to equipment can ocur.

9. INSTALL NEW LOCKRING (4).
   a. Position drive tool (5) in lockring (4) on insert (1).
   b. Using hammer, strike top of drive tool (5) until lockring (4) is in position. See task for proper installation depth.

GO TO NEXT PAGE



10. INSPECT NEW LOCKRING (1) FOR DAMAGE.
    a. If lockring (1) is not in position or is damaged, go to step 1.
11. CLEAN NEW LOCKRING (1), INSERT (2), AND RELATED HOUSING. See page 2-2.

END OF SUBTASK

END OF TASK

CHAPTER 3

INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. TRANSMISSION ASSEMBLY

TASK INDEX

Task	Page
Replace Encased Seal	3-2
Replace Controller Fluid Filter Element	3-5

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE ENCASED SEAL

DESCRIPTION

This task covers: Remove (page 3-2). Install (page 3-3).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Oil seal replacer — (Item 55, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Cleaning solvent—(Item 1, App B)
Petrolatum—(Item 7, App B)
Sealant compound — (Item 11, App B)

Materials/Parts: (cont)

Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)
Wood block (3) — (Item 2, App D)
Clutch cover gasket
Lock washer (12)
Plain encased seal

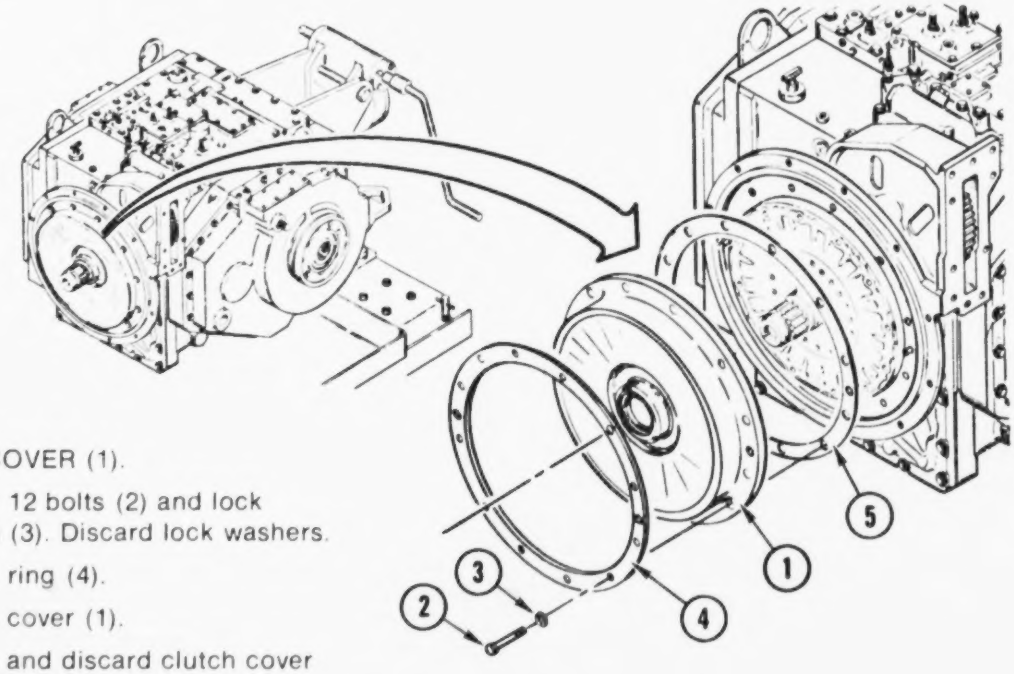
Personnel Required:

Track Veh Rep 63H10

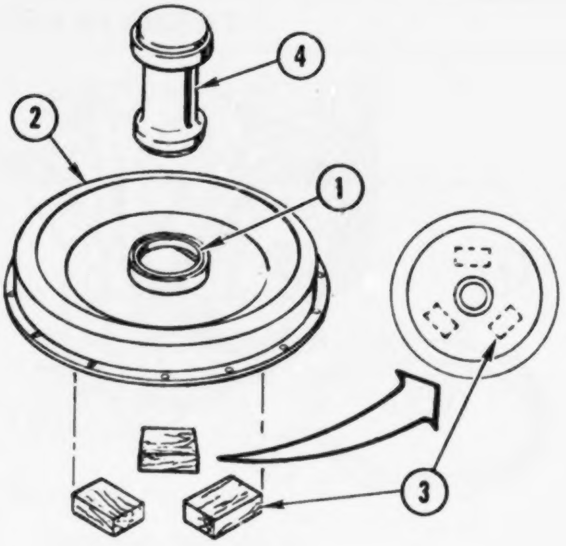
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



1. REMOVE COVER (1).
   a. Remove 12 bolts (2) and lock washers (3). Discard lock washers.
   b. Remove ring (4).
   c. Remove cover (1).
   d. Remove and discard clutch cover gasket (5).

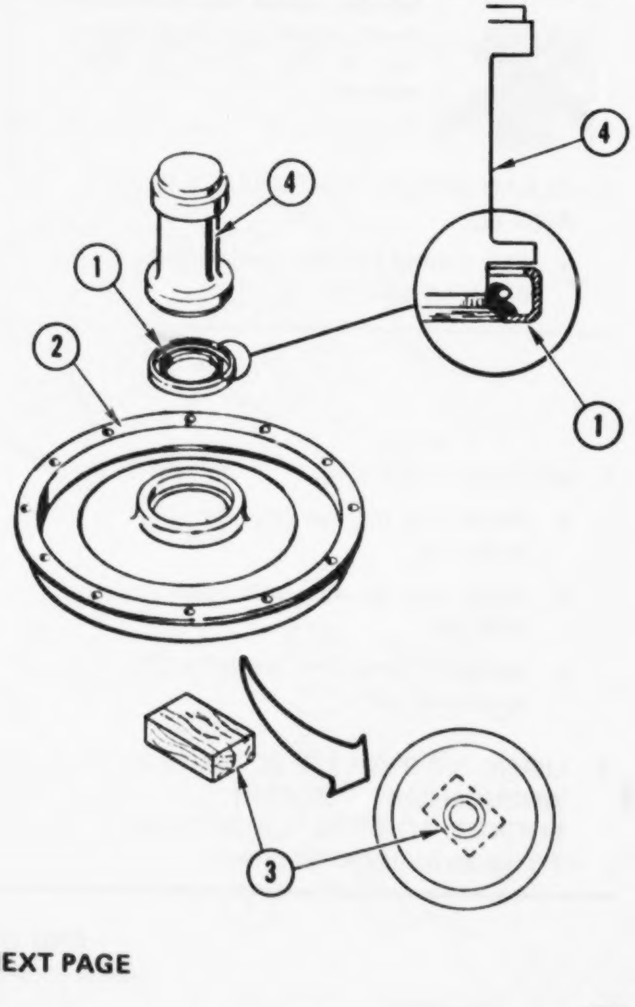


CAUTION

Do not remove encased seal unless cover is properly blocked to prevent bending. Damage to equipment can occur.

2. REMOVE PLAIN ENCASED SEAL (1).
   a. Position cover (2) on three 2- by 4- by 6-inch wood blocks (3).
   b. Fit small end of oil seal replacer (4) into seal (1).
   c. Using plastic-faced hammer, tap seal (1) from cover (2) and discard seal.

INSTALL

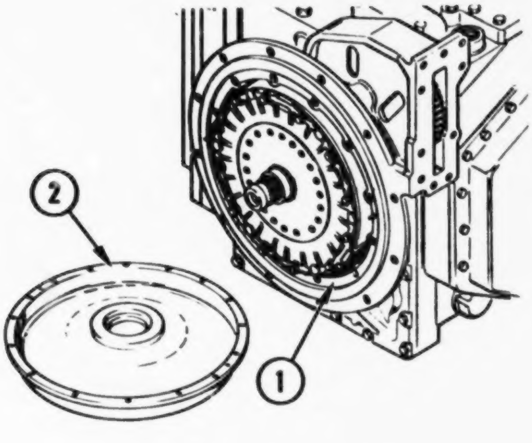


CAUTION

Do not install seal without properly blocking cover. Damage to cover can occur.

3. POSITION COVER (2).
   a. Position cover (2) on one 2- by 4- by 6-inch wood block (3).
4. INSTALL NEW SEAL (1).
   a. Coat inside of new seal (1) with transmission oil.
   b. Fit large end of oil seal replacer (4) into new seal (1).
   c. Coat outside of seal (1) with sealant compound. Using plastic-faced hammer, tap seal into cover (2).

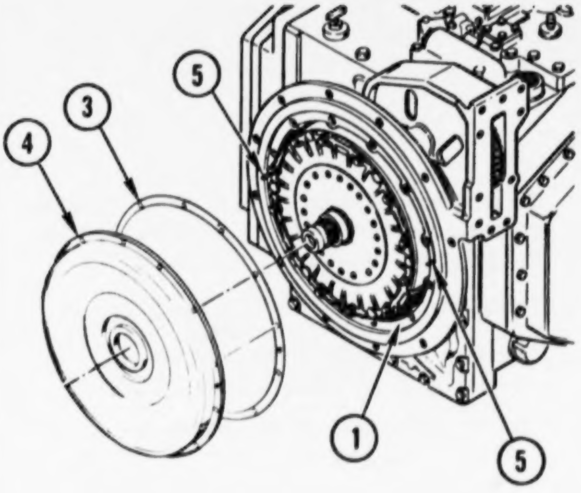
GO TO NEXT PAGE



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

5. CLEAN MOUNTING SURFACES (1) AND (2).
   a. Use wiping rag dampened with cleaning solvent.



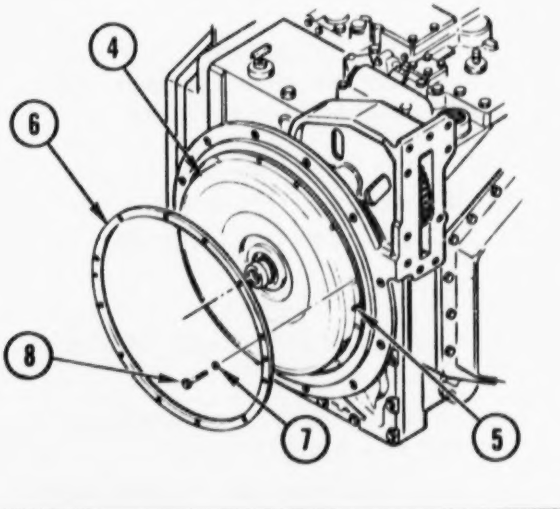
CAUTION

Do not allow lip of seal to catch on shaft. Seal may leak causing damage to equipment.

6. POSITION NEW GASKET (3) AND COVER (4).
   a. Apply petrolatum to gasket mounting surface (1).
   b. Aline new gasket (3) with pins (5), and position on mounting surface (1).
   c. Aline cover (4) with pins (5), and position on mounting surface (1).

7. SECURE COVER (4).
   a. Place ring (6), flat side out, on cover (4).
   b. Aline ring (6) with bolt holes and pins (5).
   c. Install 12 new lock washers (7) and bolts (8).

8. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE 12 BOLTS (8) TO 75-85 in-lb (86-98 cmkg).



END OF TASK

REPLACE CONTROLLER FLUID FILTER ELEMENT

DESCRIPTION

This task covers: Remove (page 3-5). Install (page 3-7).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder —
(Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Transmission oil — (Item 12, App B)

Materials/Parts: (cont)

Wiping rag—(Item 13, App B)
Hydraulic o-ring packing
Lock washer (4)
Preformed packing (2)

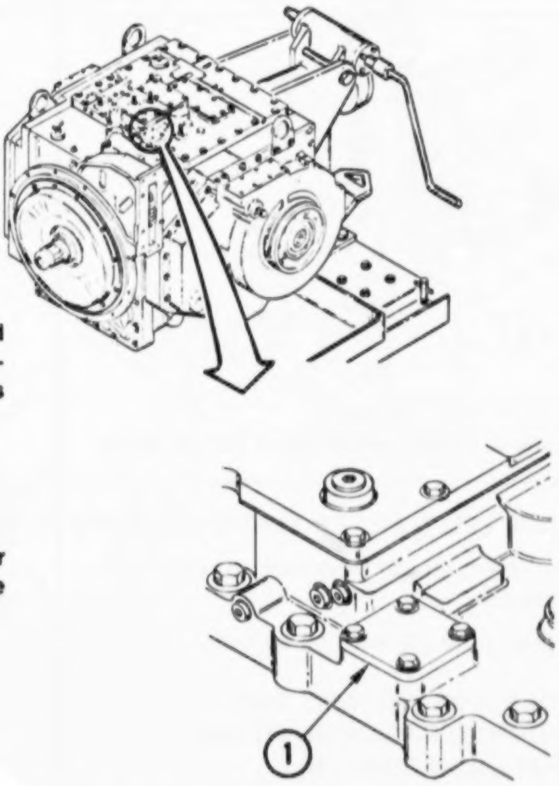
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



WARNING

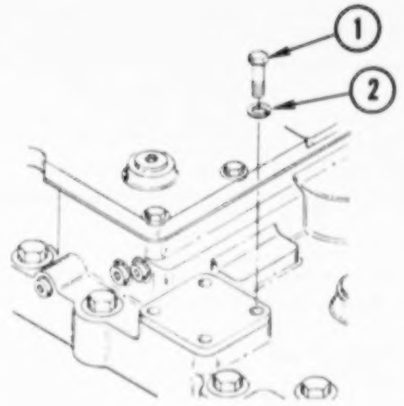
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

CAUTION

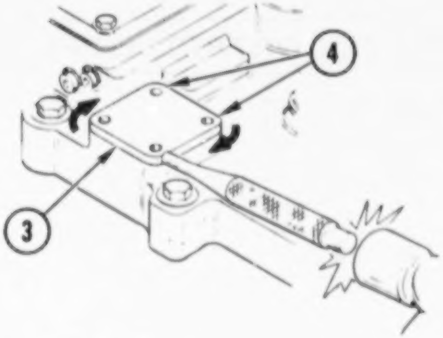
Do not allow dirt to remain around controller cap. Dirt falling in transmission can cause damage.

1. CLEAN CONTROLLER CAP (1).
   a. Using wiping rag dampened with cleaning solvent, clean cap (1) and area around cap.

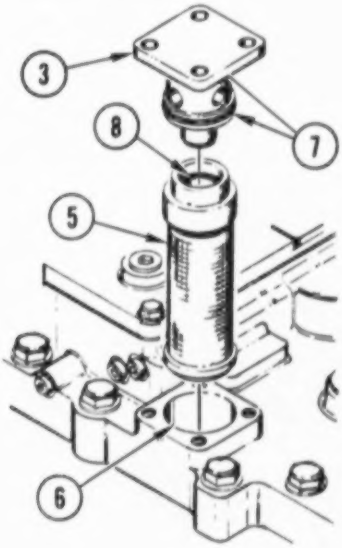
GO TO NEXT PAGE



2. REMOVE FOUR SCREWS (1) AND LOCK WASHERS (2). DISCARD LOCK WASHERS.



3. REMOVE CAP (3).
   a. Using hammer and punch, rotate cap (3) to the right. Rotate until pry bar can be placed under a corner (4) of cap.
   b. Using pry bar under cap (3), pry up cap and lift off.

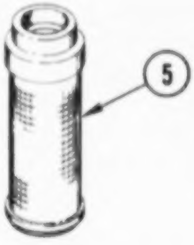


NOTE

Filter element may be found either on cap or in hole.

4. REMOVE FLUID FILTER ELEMENT (5).
   a. Pull element (5) from cap (3) or hole (6).
   b. Cover hole (6) with clean rag.

5. REMOVE AND DISCARD TWO PREFORMED PACKINGS (7) AND HYDRAULIC O-RING (8).



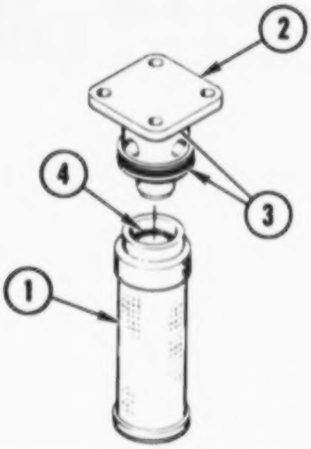
6. CHECK ELEMENT (5) FOR METAL CHIPS.
   a. If chips are found, check main transmission filter for chips. See task INSPECT TRANSMISSION FOR CONTAMINATION, page 4-67.
   b. If no chips are found, go to step 7.

WARNING

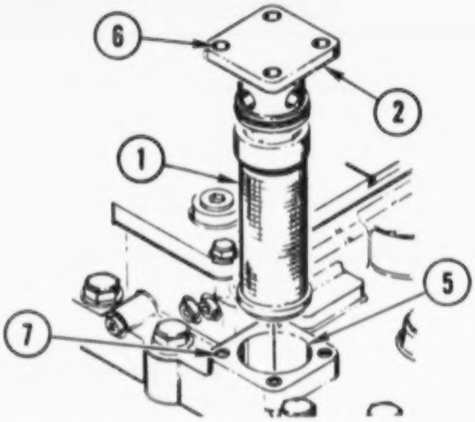
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

7. CLEAN ELEMENT (5).
   a. Using cleaning solvent, clean element (5).

INSTALL



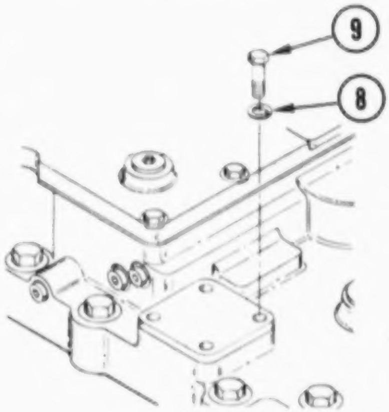
8. INSTALL ELEMENT (1) ON CAP (2).
   a. Coat two new preformed packings (3) and o-ring (4) with transmission oil.
   b. Install two new packings (3) on cap (2).
   c. Install new o-ring (4) in top of element (1).
   d. Install element (1) on cap (2).



9. INSTALL CAP (2) WITH ELEMENT (1).
   a. Remove rag and push cap (2) with element (1) into hole in controller assembly (5).
   b. Aline four screw holes (6) in cap (2) with screw holes (7) in controller assembly (5).
   c. Using plastic-faced hammer, tap and seat cap (2) into place.

10. INSTALL FOUR NEW LOCK WASHERS (8) AND SCREWS (9).

11. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (9) TO 85-110 in-lb (98-127 cmkg).



END OF TASK

Section II. LEFT-HAND HYDRAULIC ASSEMBLY

TASK INDEX

Task | Page
Replace Left-Hand Hydraulic Actuator Valve Assembly 3-10

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE LEFT-HAND HYDRAULIC ACTUATOR VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 3-10). Install (page 3-11).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Materials/Parts:

Transmission oil—(Item 12, App B)

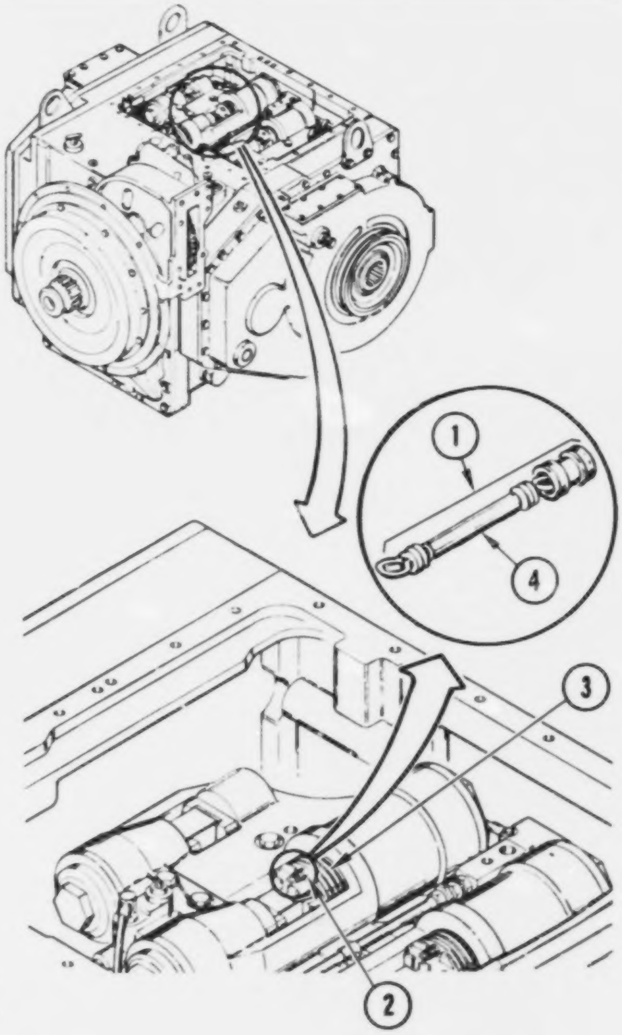
Personnel Required:

Track Vehicle Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand.
See page **2-144.**

REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

CAUTION

Do not bend tube when removing actuator valve assembly. Valve assembly can be damaged.

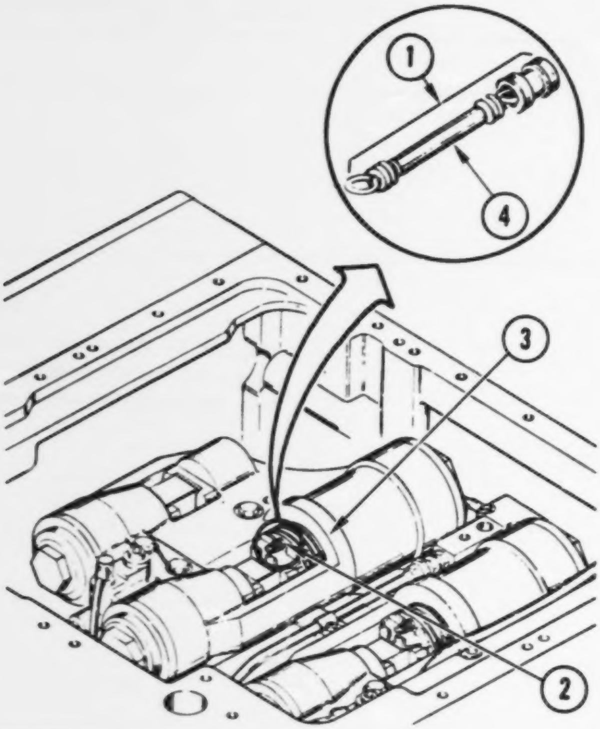
2. REMOVE LEFT-HAND HYDRAULIC ACTUATOR VALVE ASSEMBLY (1).
   a. Carefully pull valve assembly (1) straight out of hole (2) in actuator piston assembly (3). Do not bend tube (4).

CAUTION

Do not bend or straighten any part of valve assembly. Equipment can be damaged.

3. INSPECT VALVE ASSEMBLY (1) FOR STRAIGHTNESS.
   a. Replace valve assembly (1) if any part of valve assembly is bent or damaged.

INSTALL



CAUTION

Do not bend or straighten any part of valve assembly during installation. Equipment can be damaged.

4. INSTALL VALVE ASSEMBLY (1).
   a. Coat valve assembly (1) with transmission oil.
   b. Carefully slide valve assembly (1) into hole (2) in actuator piston assembly (3). Be sure not to bend tube (4).
5. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

Section III. RIGHT-HAND HYDRAULIC ASSEMBLY

TASK INDEX

Task | Page
Replace Right-Hand Hydraulic Actuator Valve Assembly 3-14

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE RIGHT-HAND HYDRAULIC ACTUATOR VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 3-14). Install (page 3-15).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Materials/Parts:

Transmission oil—(Item 12, App B)

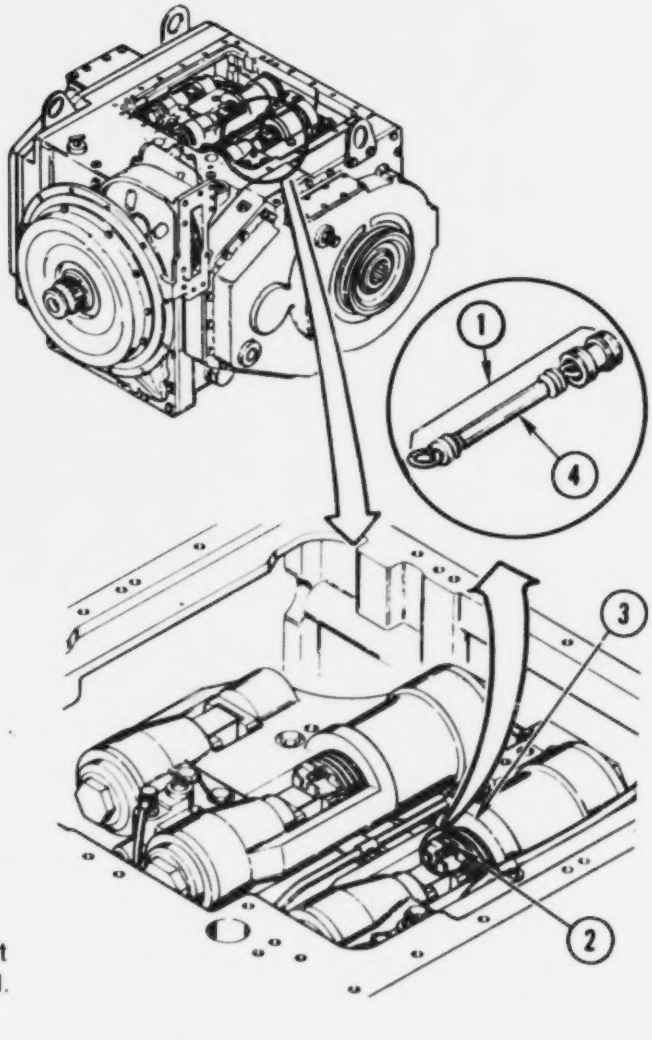
Personnel Required:

Track Vehicle Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

CAUTION

Do not bend tube when removing actuator valve assembly. Valve assembly can be damaged.

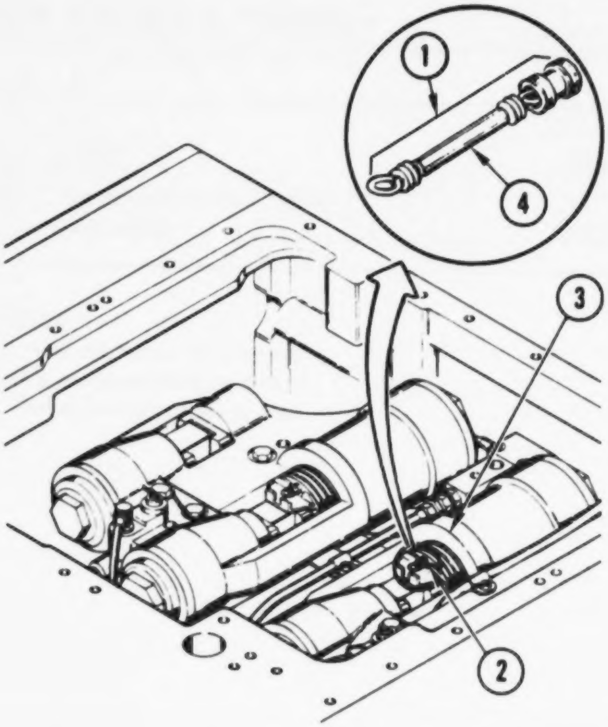
2. REMOVE RIGHT-HAND HYDRAULIC ACTUATOR VALVE ASSEMBLY (1).
   a. Carefully pull valve assembly (1) straight out of hole (2) in actuator piston assembly (3). Do not bend tube (4).

CAUTION

Do not bend or straighten any part of valve assembly. Equipment can be damaged.

3. INSPECT VALVE ASSEMBLY (1) FOR STRAIGHTNESS.
   a. Replace valve assembly (1) if any part of valve assembly is bent or damaged.

INSTALL



CAUTION

Do not bend or straighten any part of valve assembly during installation. Equipment can be damaged.

4. INSTALL VALVE ASSEMBLY (1).
   - a. Coat valve assembly (1) with transmission oil.
   - b. Carefully slide valve assembly (1) into hole (2) in actuator piston assembly (3). Be sure not to bend tube (4).
5. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

Section IV. OIL FILTER COVER ASSEMBLY

TASK INDEX

Task	Page
Replace Oil Filter Cover Assembly	3-18
Repair Oil Filter Cover Assembly	3-21

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE OIL FILTER COVER ASSEMBLY

DESCRIPTION

This task covers: Remove (page 3-18). Install (page 3-20).

INITIAL SETUP

Tools:

- Fluid gun — (Item 31, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Torque wrench — (Item 100, App C)
- Measuring device — 1/4 to 1/2 teaspoon

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)

Materials/Parts: (cont)

- Fluid pressure parts kit

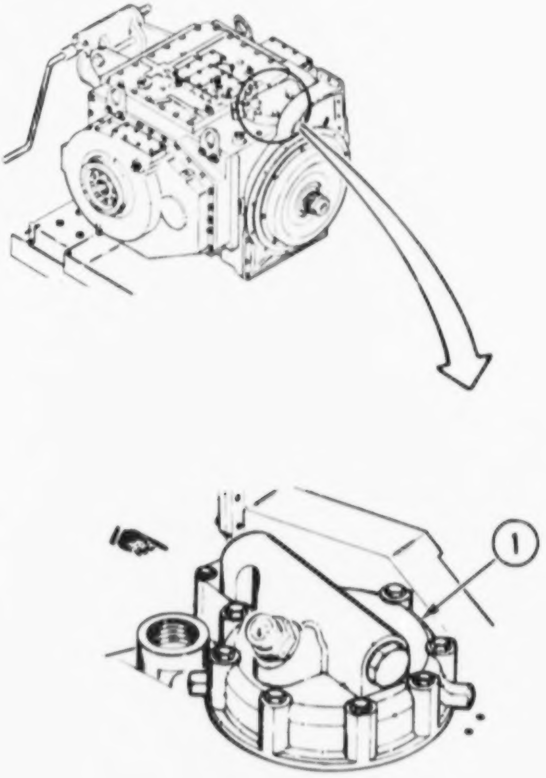
Personnel Required:

- Track Veh Rep 63T10

Equipment Conditions:

- Transmission mounted on tip-over stand. See page 2-144.

REMOVE



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

CAUTION

Loose dirt on and around oil filter cover assembly can fall into transmission when cover is removed. Dirt inside transmission will cause damage.

1. CLEAN OIL FILTER COVER ASSEMBLY (1) AND AREA AROUND ASSEMBLY.
   a. Use wiping rag dampened with cleaning solvent.

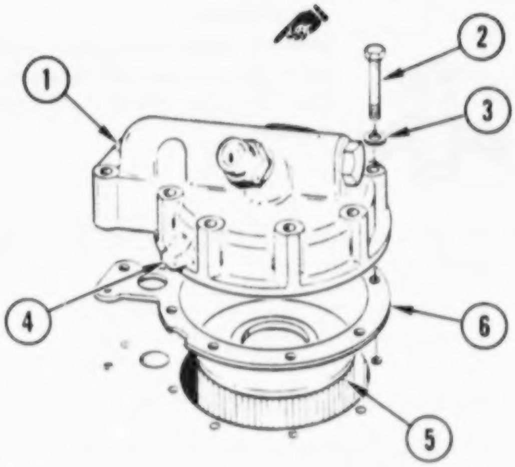
2. LOOSEN COVER ASSEMBLY (1).
   a. Remove 10 screws (2) and lock washers (3). Discard lock washers.
   b. Pry under two tabs (4) a little at a time until cover assembly (1) is loose.

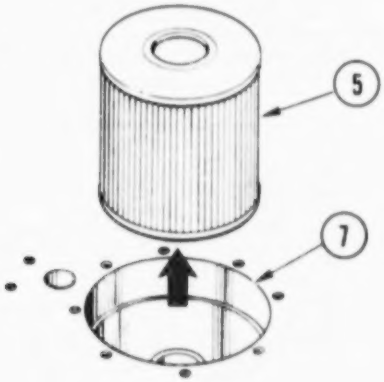
NOTE

Filter element may come out with filter cover assembly.

3. REMOVE COVER ASSEMBLY (1).
   a. Remove cover assembly (1). If oil filter element (5) comes out with cover assembly, separate element from assembly.

4. REMOVE AND DISCARD OIL FILTER GASKET (6).



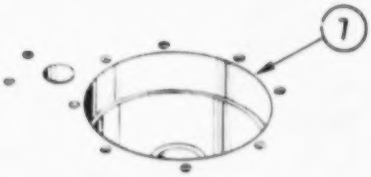


5. INSPECT ELEMENT (5).
   a. Pull element (5) straight up and out of oil filter cavity (7).
   b. If element (5) is damaged or contaminated with metal chips, go to step 6. If not, go to step 8.

6. INSPECT TRANSMISSION FOR CONTAMINATION, page **4-67.**

7. GO TO END OF TASK.

8. DISCARD ELEMENT (5).



9. CHECK FILTER CAVITY (7).
   a. Using fluid gun, remove remaining oil from cavity (7).
   b. Using measuring device, check cavity (7) for metal chips.
   c. If more than 1/4 tsp (1 cc) of chips are found, go to step 10. If not, go to step 12.

10. INSPECT TRANSMISSION FOR CONTAMINATION, page **4-67.**

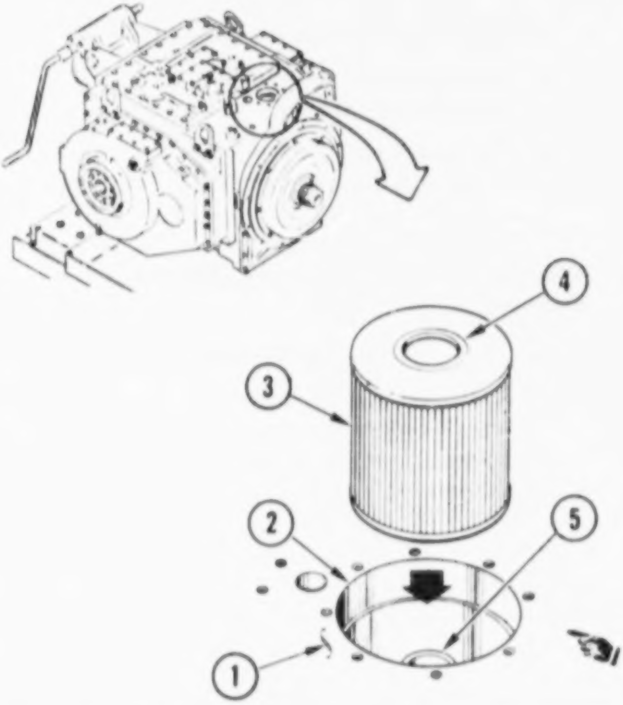
11. GO TO END OF TASK.

GO TO NEXT PAGE

INSTALL

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.



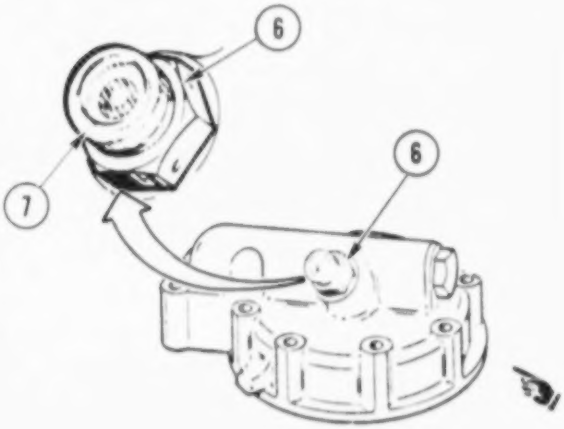
12. CLEAN MOUNTING SURFACE (1) AND FILTER CAVITY (2).

    a. Use wiping rag dampened with cleaning solvent.

13. INSTALL NEW ELEMENT (3).

    a. Coat preformed packing (4) on each end of new element (3) and spindle (5) with clean transmission oil.

    b. Put element (3) on spindle (5) and push it down into cavity (2) until firmly seated.



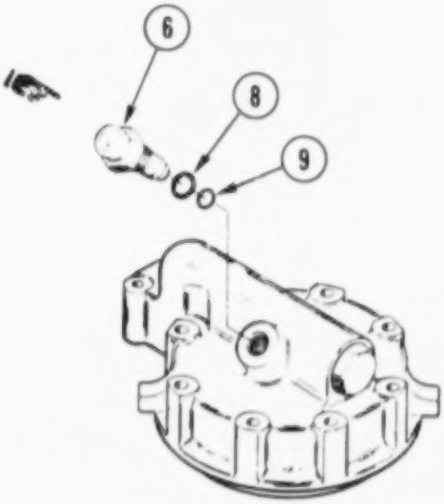
CAUTION

Flexible cover must be in position on pressure indicator at all times. Damage to equipment can occur.

14. INSPECT PRESSURE INDICATOR (6).

    a. If flexible cover (7) is not on indicator (6), go to step 15.

    b. If flexible cover (7) is on indicator (6), go to step 18.



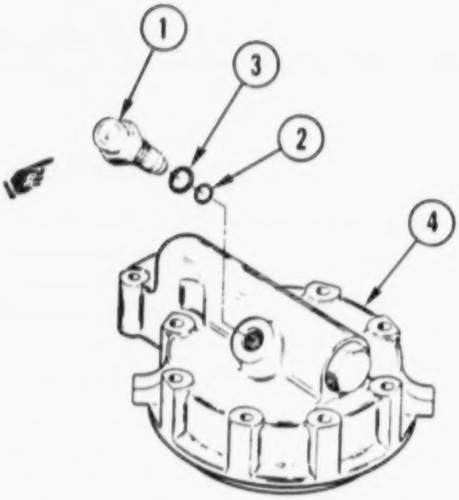
15. REMOVE PRESSURE INDICATOR (6).

    a. Unscrew indicator (6).

    b. Discard indicator (6) and preformed packings (8) and (9).

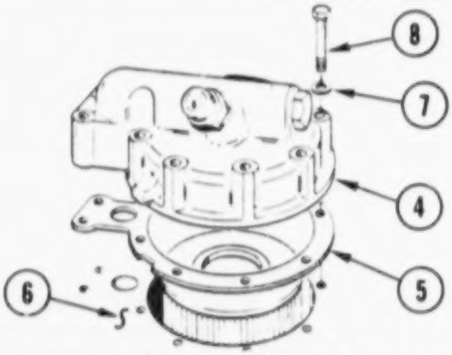
16. INSTALL NEW PRESSURE INDICATOR (1).
    a. Coat new preformed packings (2) and (3) with transmission oil.
    b. Install preformed packings (2) and (3) on new indicator (1).
    c. Install indicator (1) in cover assembly (4).
    d. (H) Hold cover assembly (4) on workbench.

17. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE INDICATOR (1) TO 20-25 ft-lb (3 mkg).



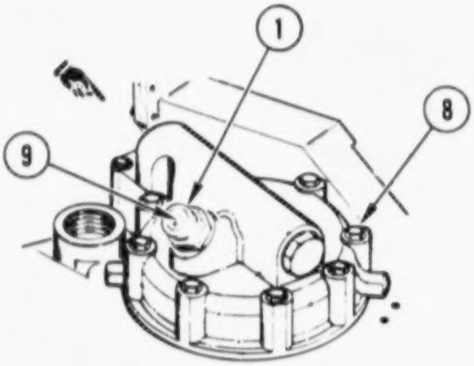
WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

18. CLEAN COVER ASSEMBLY (4).
    a. Use wiping rag dampened with cleaning solvent.



19. INSTALL COVER ASSEMBLY (4).
    a. (Deleted)
    b. Put new gasket (5) in place on mounting surface (6) and aline with screw holes.
    c. Aline cover assembly (4) with gasket (5). Press assembly in place.

20. INSTALL 10 NEW LOCK WASHERS (7) AND SCREWS (8).



21. USING 1/2-INCH DRIVE TORQUE WRENCH, EVENLY TORQUE 10 SCREWS (8) TO 30-35 ft-lb (4-5 mkg).

22. RESET INDICATOR (1).
    a. Press button (9) on indicator (1).

END OF TASK

REPAIR OIL FILTER COVER ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 3-21). Assemble (page 3-23).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Impact socket set — (Item 38, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer caliper set — (Item 53, App C)
- Socket wrench adapter — (Item 76, App C)
- Telescoping gage set — (Item 93, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Transmission oil—(Item 12, App B)
- Preformed packing
- Preformed packing
- Preformed packing

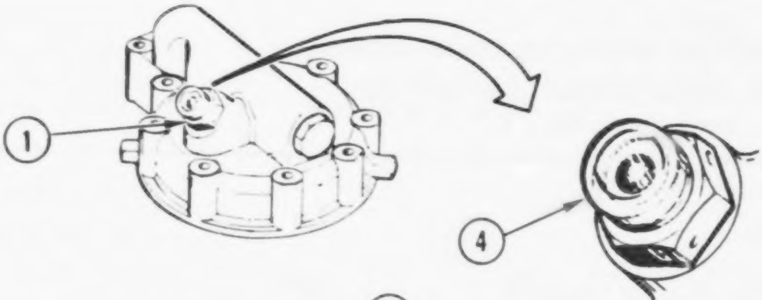
Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

Equipment Conditions:

Oil filter cover assembly on workbench. See page 3-18.

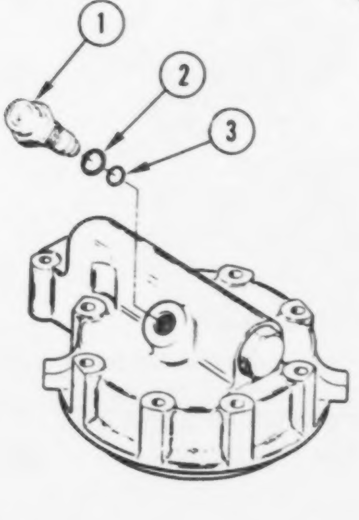
DISASSEMBLE



CAUTION

Flexible cover must be in position on pressure indicator at all times. Damage to equipment can occur.

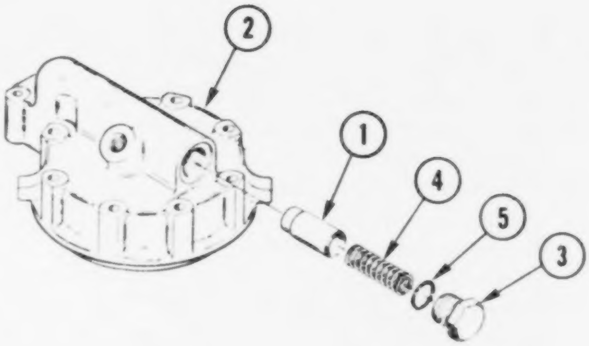
1. REMOVE PRESSURE INDICATOR (1).
   a. Unscrew indicator (1).
   b. Remove and discard preformed packings (2) and (3).
2. INSPECT PRESSURE INDICATOR (1) FOR FLEXIBLE COVER (4).
   a. If flexible cover (4) is on indicator (1), go to step 3. If not, replace indicator.



CAUTION

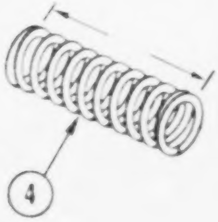
Bolt is under spring pressure. Use care when removing bolt. Failure to do so can result in loss of parts.

3. REMOVE BYPASS VALVE PISTON (1) FROM OIL FILTER COVER ASSEMBLY (2).
   a. (H) Hold cover assembly (2) on workbench.
   b. Using adapter and 35-mm socket, remove bolt (3) releasing spring (4) and piston (1). Remove spring and piston.
   c. Remove and discard preformed packing (5).

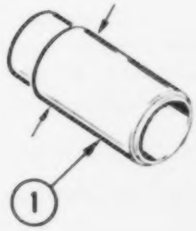


4. CLEAN OIL FILTER COVER ASSEMBLY.
   a. Clean oil filter cover and piece parts. See page 2-2.

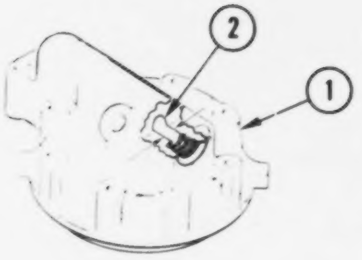
5. INSPECT OIL FILTER COVER ASSEMBLY.
   a. Inspect oil filter cover and piece parts. See page 2-5.



6. CHECK SPRING (4).
   a. Using inside indicator caliper, measure free length of spring (4). Replace spring if free length is less than 3.98 inches (101.09 mm).

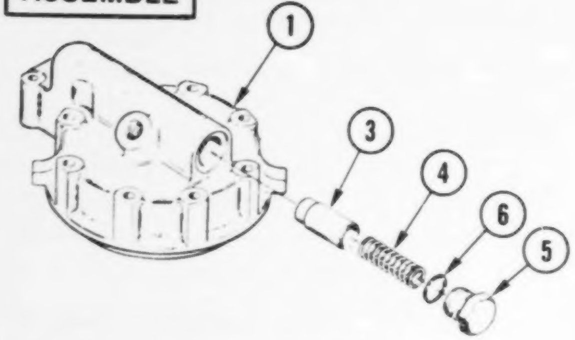


7. CHECK PISTON (1).
   a. Using micrometer caliper set, measure outside diameter of piston (1). Replace piston if diameter is less than 1.059 inches (26.90 mm).



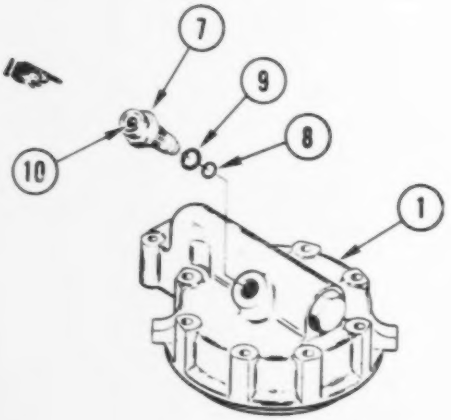
8. CHECK COVER (1).
   a. Using micrometer caliper set and telescoping gage set, measure inside diameter of bore (2). Do not measure threads. Replace cover (1) if diameter is more than 1.064 inches (27.03 mm).

ASSEMBLE



9. INSERT PISTON (3) AND SPRING (4) IN COVER (1).
10. INSTALL BOLT (5).
    a. Coat new preformed packing (6) with transmission oil and install on bolt (5).
    b. (H) Hold cover (1) on workbench.
    c. Push in and turn bolt (5) until threads catch.
    d. Using adapter and 35-mm socket, install bolt (5).
11. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 35-MM SOCKET, TORQUE BOLT (5) TO 45-50 ft-lb (6-7 mkg).

12. INSTALL PRESSURE INDICATOR (7).
    a. Coat new preformed packings (8) and (9) with transmission oil.
    b. Install preformed packings (8) and (9) on indicator (7).
    c. Install indicator (7) in cover (1).
    d. (H) Hold cover (1) on workbench.
13. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE INDICATOR (7) TO 20-25 ft-lb (3 mkg).
14. RESET INDICATOR (7).
    a. Press button (10) on indicator (7).



END OF TASK

Section V. MAKEUP PUMP FLUID REGULATING VALVE

TASK INDEX

Task	Page
Replace Makeup Pump Fluid Regulating Valve	3-26
Repair Makeup Pump Fluid Regulating Valve	3-30

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE MAKEUP PUMP FLUID REGULATING VALVE

DESCRIPTION

This task covers: Remove (page 3-26). Install (page 3-28).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Micrometer caliper set — (Item 53, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Transmission oil (Item 12, App B)
Lock washer (4)
Gasket

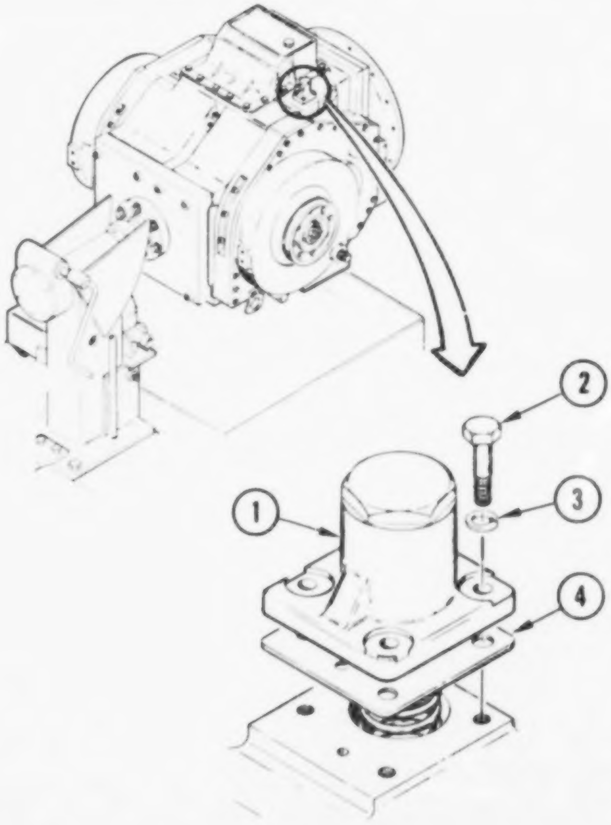
Personnel Required:

Track Veh Rep 63H10

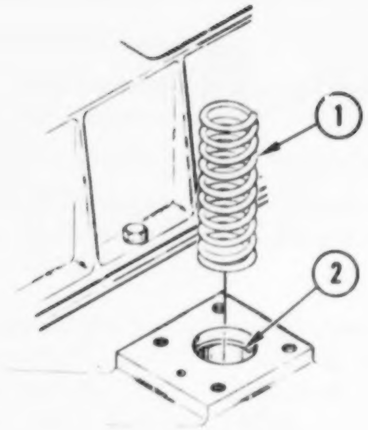
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

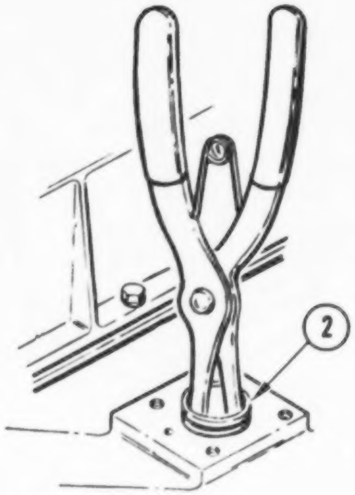
REMOVE



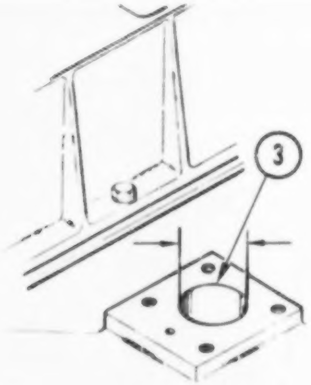
1. POSITION TRANSMISSION BOTTOM SIDE UP.
2. REMOVE FLUID REGULATING VALVE (1).
   a. Using 3/8-inch ratchet handle and 7/16-inch socket, loosen four screws (2) alternately and evenly.
   b. Press down on valve (1). Remove four screws (2) and lock washers (3). Discard lock washers.
   c. Lift off valve (1). Remove and discard gasket (4).



3. REMOVE SPRING (1) FROM CONTROL VALVE PISTON (2).

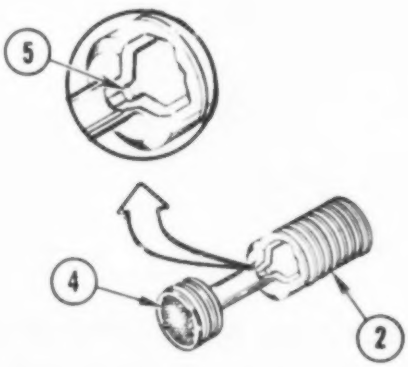


4. REMOVE PISTON (2).
   a. Using retaining ring pliers, remove piston (2).
   b. If piston (2) was removed, go to step 5. If piston cannot be removed, go to step 5.1.



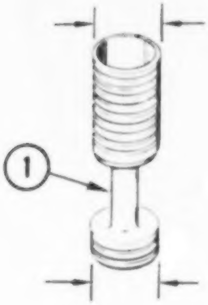
5. CHECK PISTON BORE (3).
   a. Using micrometer caliper set and telescoping gage set, measure piston bore (3).
   b. If measurement is more than 1.2515 inches (31.788 mm), go to step 5.1. If not, go to step 6.

5.1 REPLACE TRANSMISSION. RECORD FAILURE ON DA FORM 2407 AND RETURN REASEMBLED DEFECTIVE TRANSMISSION TO DEPOT.

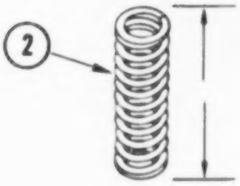


6. CLEAN PISTON SCREEN (4) AND PISTON OUTLET (5).
   a. Clean screen (4) and outlet (5). See page 2-2.
   b. Replace piston (2) if screen (4) is damaged or if outlet (5) is not clean.

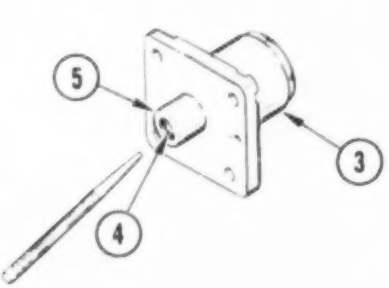
GO TO NEXT PAGE



7. CHECK PISTON (1).
   a. Using micrometer caliper set, measure diameter of piston (1).
   b. Replace piston (1) if measurement is less than 1.248 inches (31.70 mm).



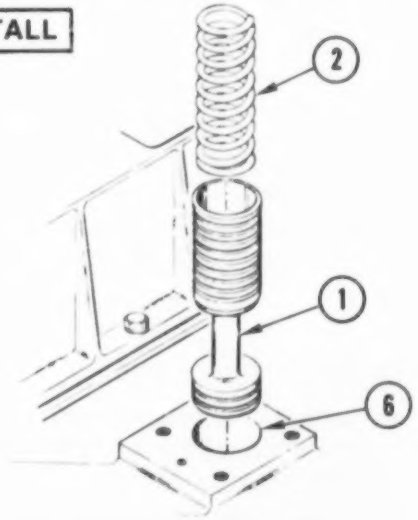
8. CHECK SPRING (2).
   a. Using inside indicator caliper, measure free length of spring (2).
   b. Replace spring (2) if free length is less than 3.28 inches (83.3 mm).



9. CHECK FLUID REGULATING VALVE (3).
   a. Using 1/4-inch pin punch, push pilot valve piston (4) gently into housing (5) and release.
   b. If piston (4) does not return to original position, go to step 9.1. If piston does return to original position, go to step 10.

9.1. REPAIR MAKEUP PUMP FLUID REGULATING VALVE, page 3-30.

INSTALL



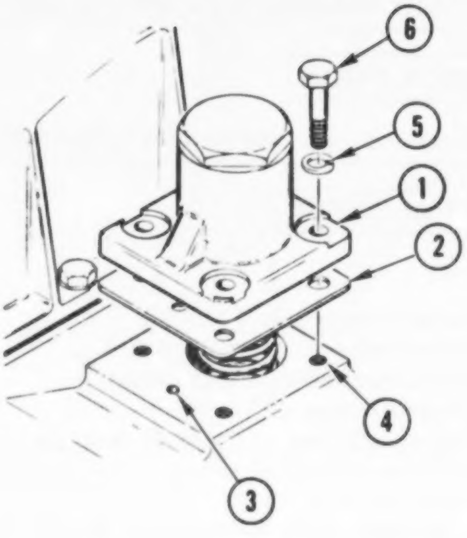
10. INSTALL CONTROL VALVE PISTON (1) AND SPRING (2).
    a. Coat piston (1) with transmission oil.
    b. Install piston (1) in piston bore (6).
    c. Install spring (2) in piston (1).

CAUTION

Holes in gasket, housing, and valve must be alined or equipment can be damaged.

11. INSTALL VALVE (1).
    a. Aline gasket (2) with oil hole (3) and screw holes (4) on housing.
    b. Aline valve (1) with gasket (2).
    c. While pressing valve (1) down, install four new lock washers (5) and screws (6).

12. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (6) TO 75-100 in-lb (83-115 cmkg).



END OF TASK

REPAIR MAKEUP PUMP FLUID REGULATING VALVE

DESCRIPTION

This task covers: Disassemble (page 3-30). Assemble (page 3-30.2).

INITIAL SETUP

Tools:

General mechanic's tool kit: automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Machinist's vise — (Item 47, App C)
Micrometer caliper set — (Item 53, App C))
Small hole gage set — (Item 72, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Preformed packing

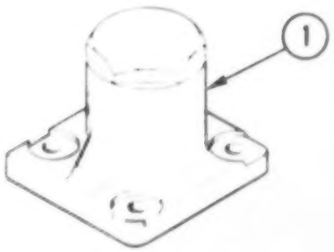
Personnel Required:

Track Veh Rep 63H10

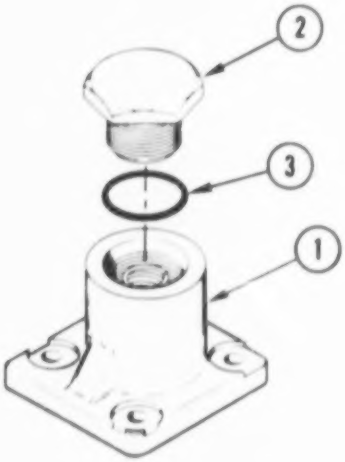
Equipment Conditions:

Fluid regulating valve on workbench. See page 3-26.

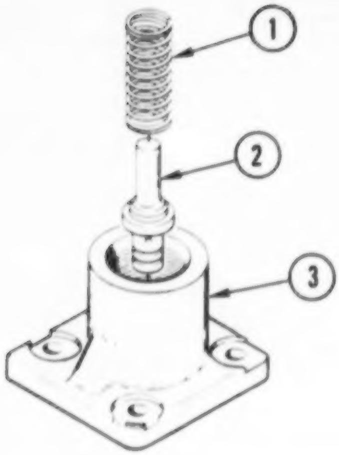
DISASSEMBLE



1. PLACE MAKEUP PUMP FLUID REGULATING VALVE (1) IN VISE.



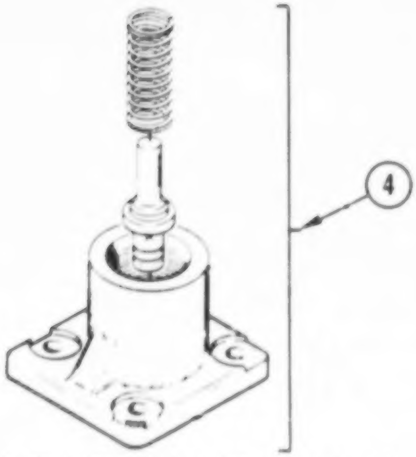
2. REMOVE CAP (2).
   a. Remove and discard preformed packing (3).
   b. Remove valve (1) from vise.



CAUTION

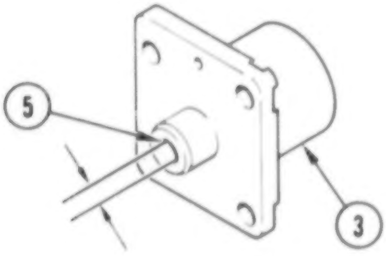
Pilot valve piston and piston bore are precision fit parts. Do not drop, scratch, or nick piston. Equipment can be damaged.

3. REMOVE SPRING (1) AND PILOT VALVE PISTON (2) FROM PILOT VALVE HOUSING (3).

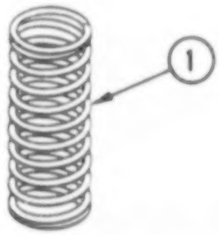


4. CLEAN FLUID REGULATING VALVE ASSEMBLY (4).
   a. Clean housing and piece parts. See page 2-2.

5. INSPECT FLUID REGULATING VALVE ASSEMBLY (4).
   a. Inspect housing and piece parts. See page 2-5.

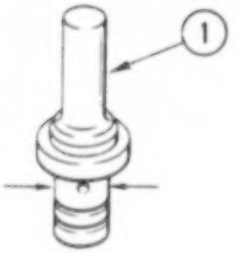


6. CHECK PISTON BORE (5) IN HOUSING (3).
   a. Using micrometer caliper set and small hole gage set, measure inside diameter of bore (5).
   b. If measurement is 0.3135 inch (7.96 mm) or less, go to step 7.
   c. If measurement is more than 0.3135 inch (7.96 mm), replace valve assembly and go to END OF TASK.



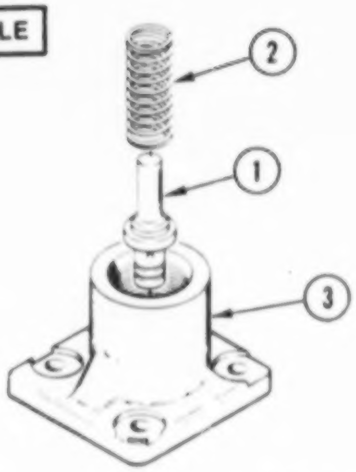
7. CHECK SPRING (1).
   a. Using indicator caliper, measure free length of spring (1). Replace spring if free length is less than 1.665 inches (42.3 mm).

GO TO NEXT PAGE

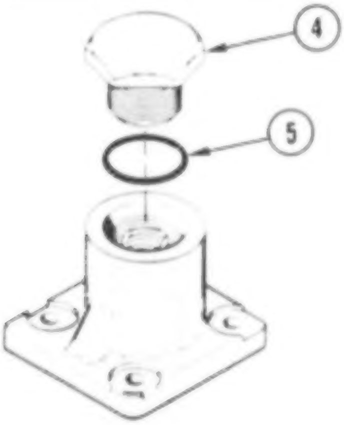


8. CHECK PISTON (1).
   a. Using micrometer caliper set, measure diameter of short end of piston (1).
   b. Replace piston (1) if measurement is less than 0.3115 inch (7.91 mm).

ASSEMBLE

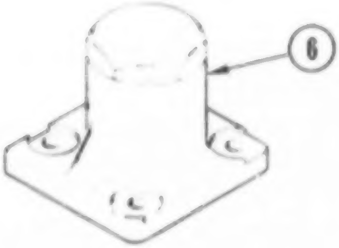


9. INSTALL PISTON (1) AND SPRING (2) IN HOUSING (3).
   a. Place housing (3) in vise.
   b. Coat piston (1) with transmission oil.
   c. Install piston (1), short end first, in housing (3).
   d. Install spring (2) on piston (1).



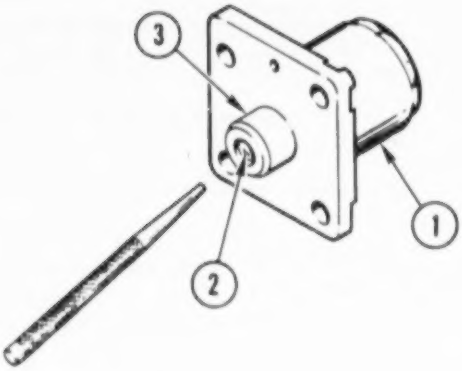
10. INSTALL CAP (4).
   a. Coat new preformed packing (5) with transmission oil.
   b. Install packing (5) on cap (4).
   c. Install cap (4).

11. USING 1/2-DRIVE TORQUE WRENCH, TORQUE CAP (4) TO 50-55 ft-lb (7-8 mkg).



12. REMOVE VALVE (6) FROM VISE.

13. CHECK FLUID REGULATING VALVE (1).
    a. Using 1/4-inch pin punch, push piston (2) gently into housing (3) and release.
    b. If piston (2) does not return to original position, replace fluid regulating valve (1).



END OF TASK

Section VI. CONTROLLER ASSEMBLY

TASK INDEX

Task Page

Replace Controller Assembly 3-32

Replace Pressure Fluid Filter 3-42

Task Page

Repair Controller Assembly Encased Seals 3-44

Repair Controller Steering Control Arm 3-46

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE CONTROLLER ASSEMBLY

DESCRIPTION

This task covers: Remove (page 3-32). Install (page 3-36).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 85, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Cleaning solvent—(Item 1, App B)
- Transmission oil—(Item 12, App B)

Materials/Parts: (cont)

- Wiping rag—(Item 13, App B)
- Controller gasket
- Gasket
- Hydraulic o-ring packing
- Lock washer (14)
- Lock washer (24)
- Preformed packing
- Preformed packing (2)

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

Equipment Conditions:

- Transmission mounted on tip-over stand. See page 2-144.

REMOVE

WARNING

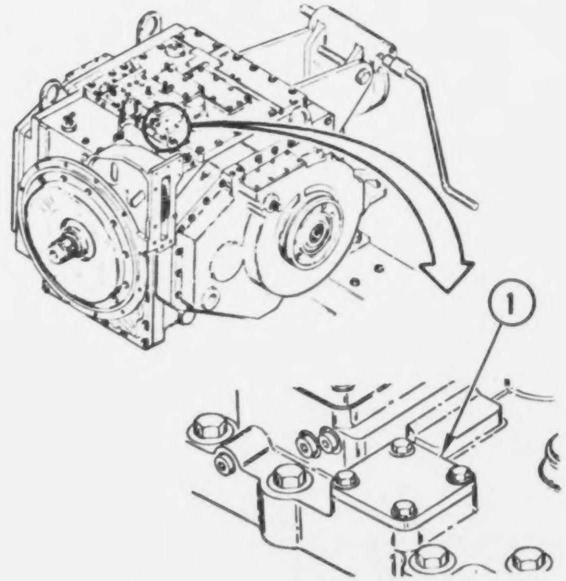
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

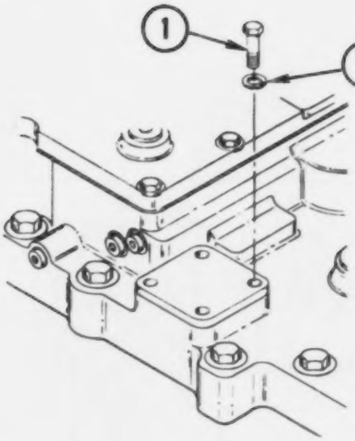
CAUTION

Do not allow dirt to remain around controller cap. Dirt falling in transmission can cause damage.

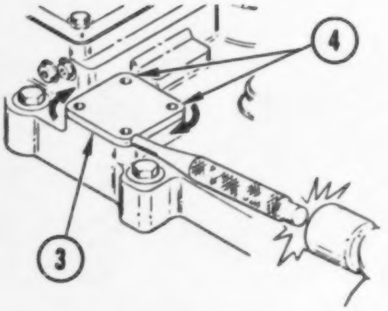
1. CLEAN CONTROLLER CAP (1).

   a. Using wiping rag dampened with cleaning solvent, clean cap (1) and area around cap.

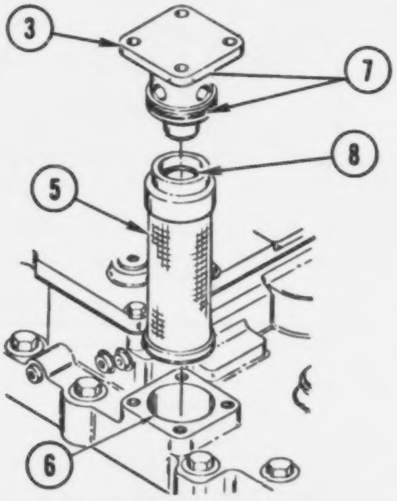




2. REMOVE FOUR SCREWS (1) AND LOCK WASHERS (2). DISCARD LOCK WASHERS.



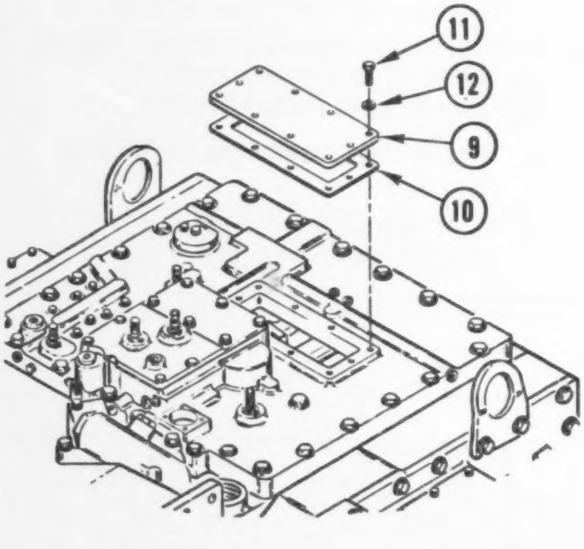
3. REMOVE CAP (3).
   a. Using hammer and punch, rotate cap (3) to the right. Rotate until pry bar can be placed under a corner (4) of cap.
   b. Using pry bar under cap (3), pry up cap and lift off.



NOTE

Filter element may be found either on cap or in hole.

4. REMOVE FLUID FILTER ELEMENT (5).
   a. Pull element (5) from cap (3) or hole (6).
   b. Cover hole (6) with clean rag.
5. REMOVE AND DISCARD TWO PREFORMED PACKINGS (7) AND HYDRAULIC O-RING (8).

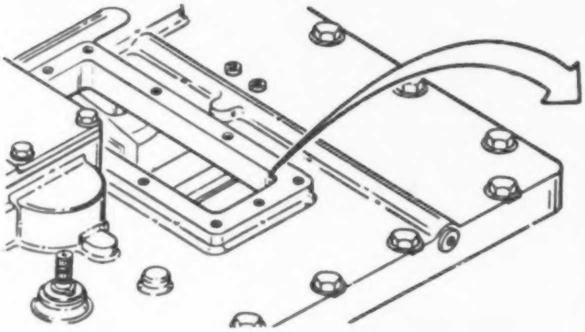


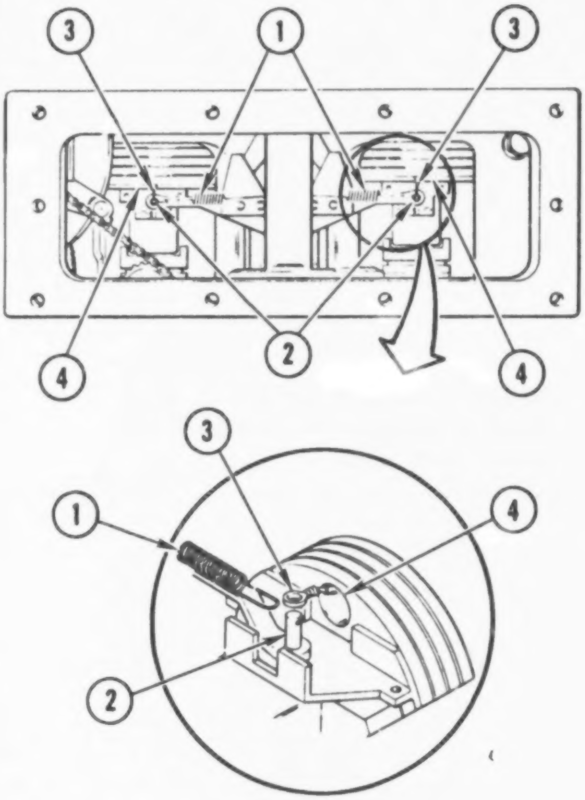
CAUTION

Failure to clean area around access cover can result in damage to transmission.

6. REMOVE ACCESS COVER (9) AND GASKET (10).
   a. Remove 10 screws (11) and lock washers (12). Discard lock washers.
   b. Lift off cover (9).
   c. Remove and discard gasket (10).

GO TO NEXT PAGE

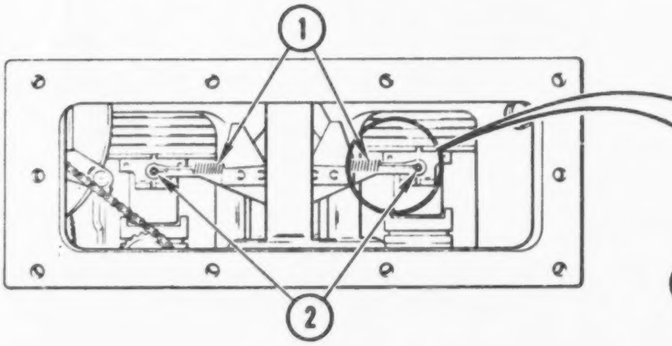


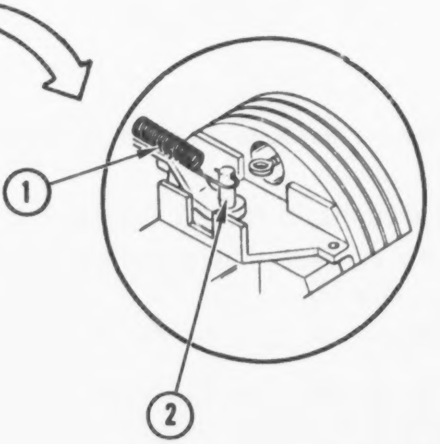


CAUTION

Do not bend springs or actuator valve assemblies. Equipment can be damaged.

7. DISCONNECT TWO HELICAL SPRINGS (1) FROM STEERING ARM PINS (2).
   a. Note broken or bent springs (1).
8. DISCONNECT TWO ACTUATOR VALVE ASSEMBLIES (3) FROM TWO STEERING ARM PINS (2).
   a. Remove two assemblies (3) from pins (2).
   b. Push two assemblies (3) into two actuator piston assemblies (4).

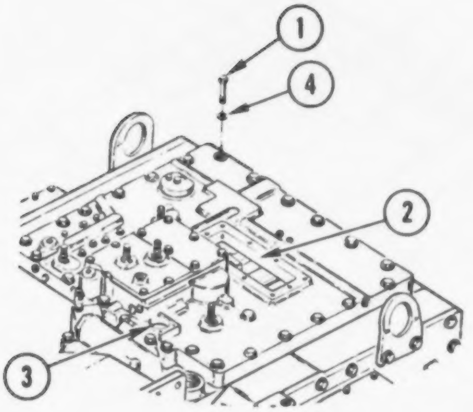




CAUTION

Do not bend two springs. Controller can be damaged.

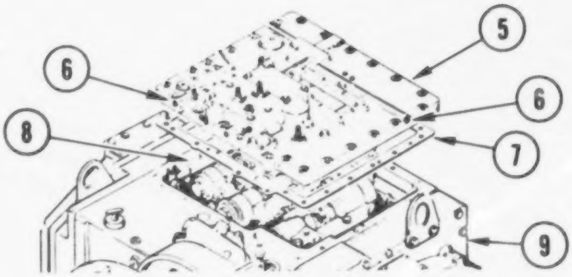
9. CONNECT TWO SPRINGS (1) TO TWO STEERING ARM PINS (2).



CAUTION

Openings in controller assembly must be covered with clean rags to prevent parts from falling into transmission. Damage to equipment can occur.

10. REMOVE 24 SCREWS (1).
    a. Cover holes (2) and (3) with clean rags.
    b. Remove 24 screws (1) and lock washers (4). Discard lock washers.
    c. Remove rags.

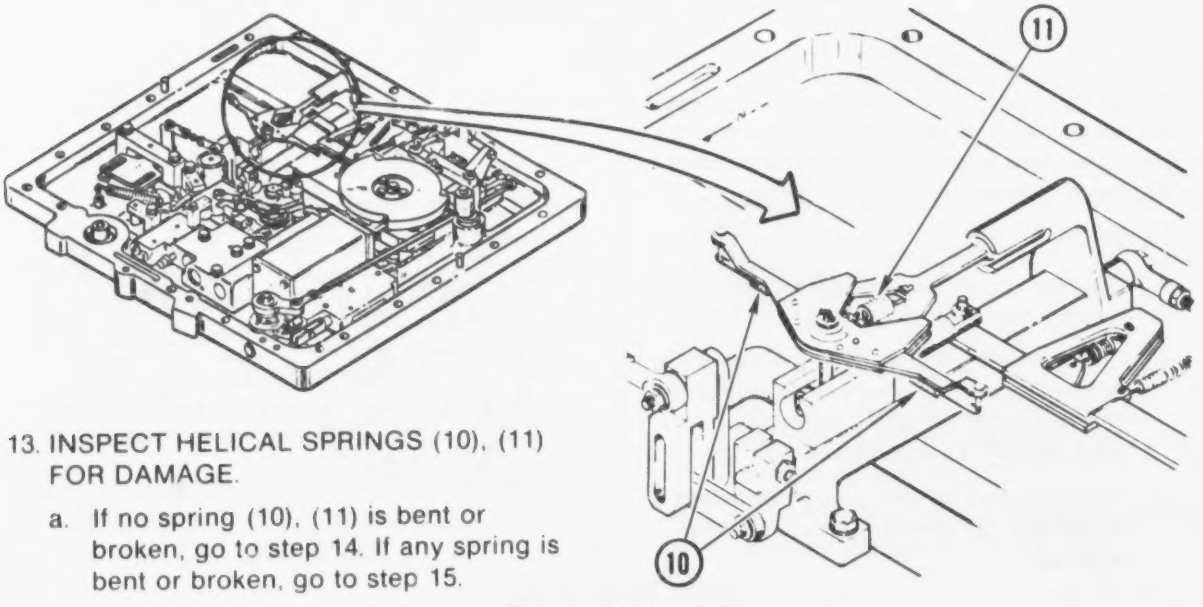


CAUTION

Use care when lifting controller to prevent damage. Keep hands free of internal controller parts. Do not set controller on workbench top side up. Use care when setting controller down to prevent damage to controller parts.

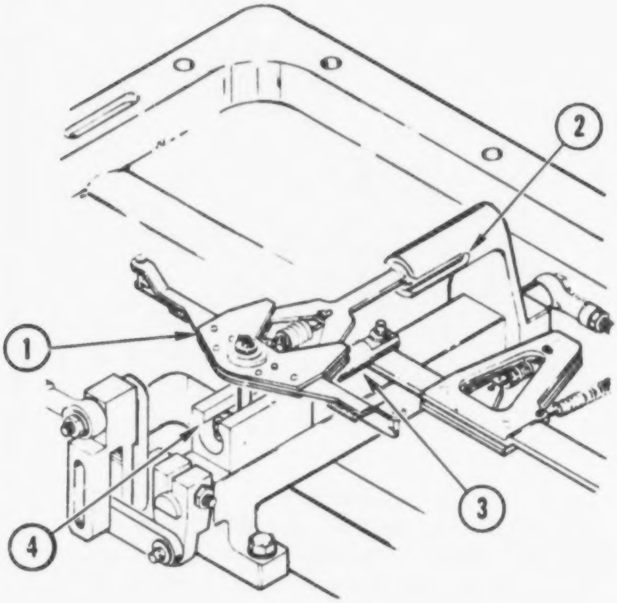
11. REPAIRER AND HELPER REMOVE CONTROLLER ASSEMBLY (5).
    a. Pry up controller assembly (5) under two plugs (6).
    b. Repairer and helper lift controller assembly (5) straight up and remove from transmission (9). Place on workbench bottom side up.
    c. Remove and discard gasket (7).

12. USING CLEAN WIPING RAG, COVER CONTROLLER OPENING (8) ON TRANSMISSION (9).



13. INSPECT HELICAL SPRINGS (10), (11) FOR DAMAGE.
    a. If no spring (10), (11) is bent or broken, go to step 14. If any spring is bent or broken, go to step 15.

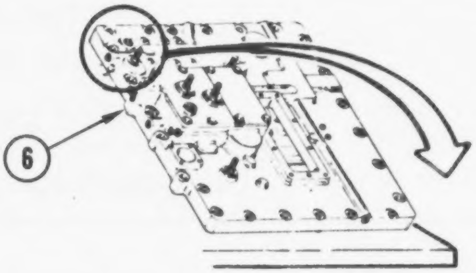
GO TO NEXT PAGE



14. INSPECT STEERING ARM ASSEMBLY (1) FOR BINDING.
    a. If assembly (1) moves freely in ball slot (2) and connecting link (3) moves freely in slot (4), go to END OF TASK. If not, go to step 15.

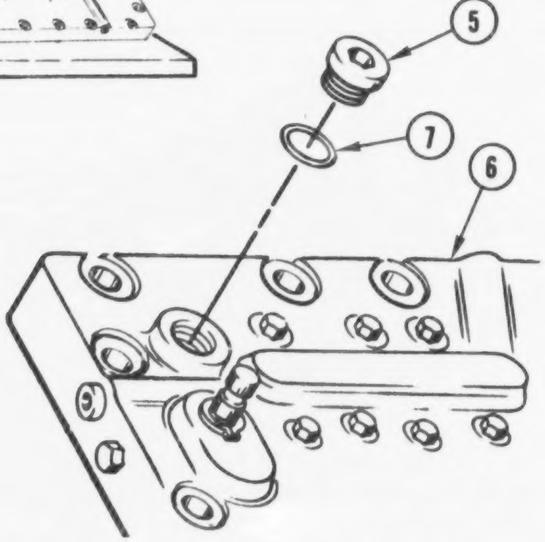
15. REPAIR CONTROLLER STEERING CONTROL ARM, page 3-46.

INSTALL

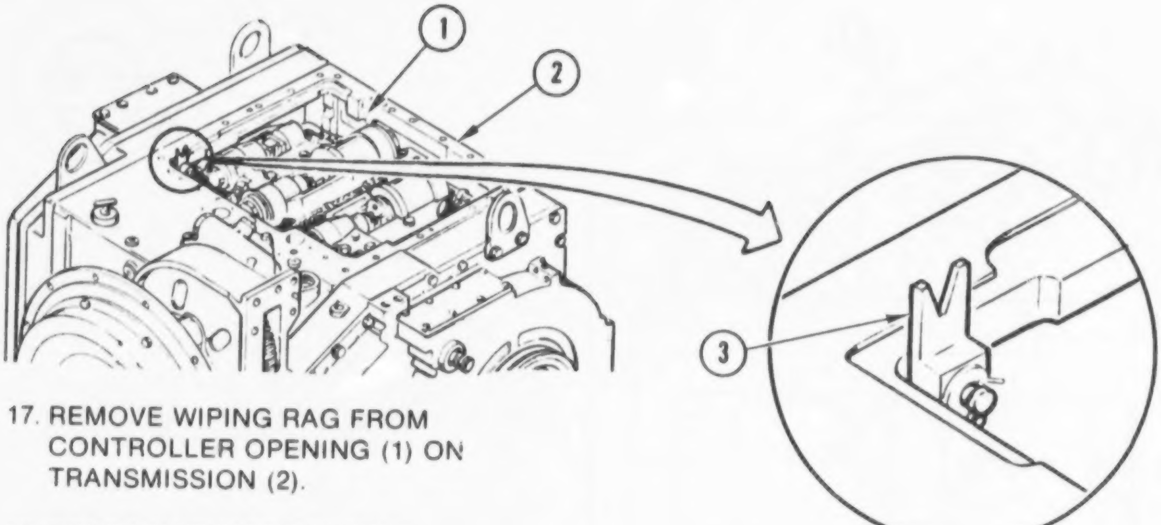


CAUTION

Do not set controller on workbench top side up. Keep hands free of internal controller parts. Use care when setting controller down to prevent damage to controller parts.

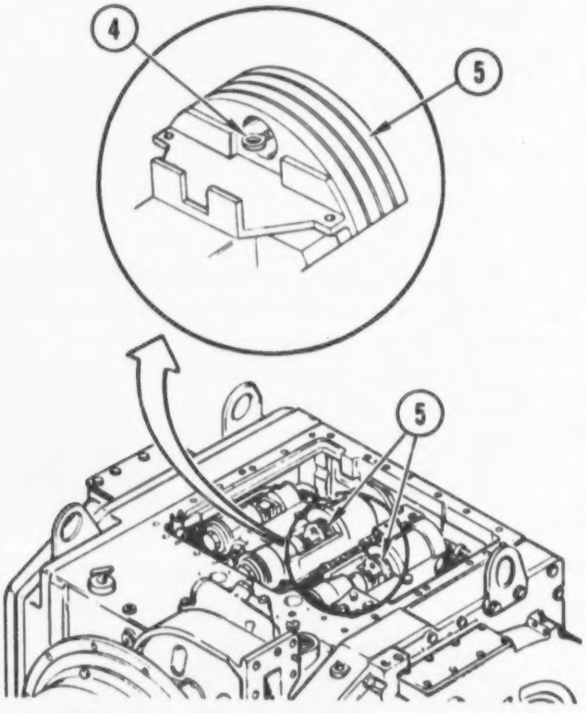


16. REMOVE PLUG (5).
    a. (H) Hold controller assembly (6) on side during removal of plug (5).
    b. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, remove plug (5) and preformed packing (7). Discard packing.
    c. Repairer and helper place controller assembly (6) on workbench bottom side up.



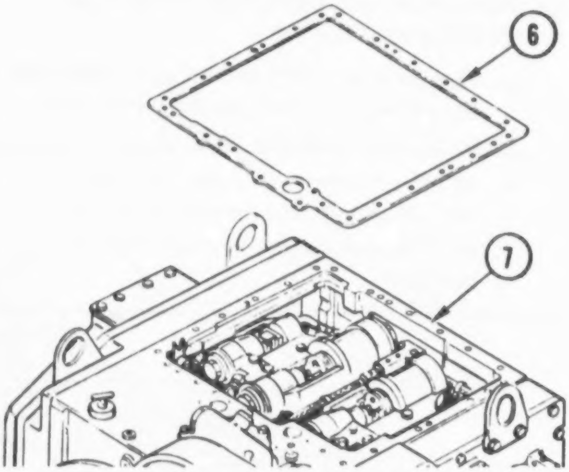
17. REMOVE WIPING RAG FROM CONTROLLER OPENING (1) ON TRANSMISSION (2).

18. POSITION SHAFT REVERSE LINK (3) STRAIGHT UP.



CAUTION
Do not bend springs or valve assemblies. Equipment can be damaged.

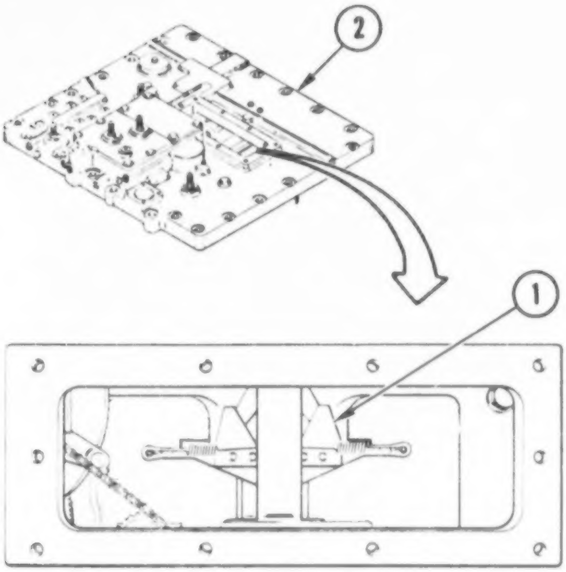
19. POSITION TWO ACTUATOR VALVE ASSEMBLIES (4) INSIDE ACTUATOR PISTON ASSEMBLIES (5).



WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

20. INSTALL NEW GASKET (6).
    a. Using wiping rag dampened with cleaning solvent, clean gasket mounting surface (7).
    b. Position new gasket (6) on mounting surface (7).

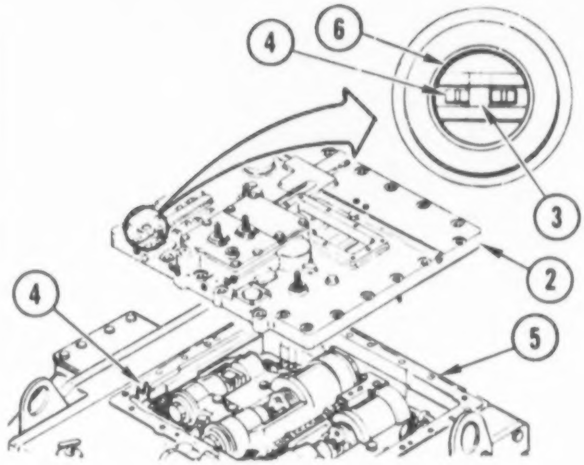
GO TO NEXT PAGE



21. REPAIRER AND HELPER POSITION STEERING ARM (1).

    a. Repairer and helper remove controller assembly (2) from workbench, turn over, and hold top side up.

    b. While holding controller assembly (2), position steering arm (1) so that it is evenly alined with opening.



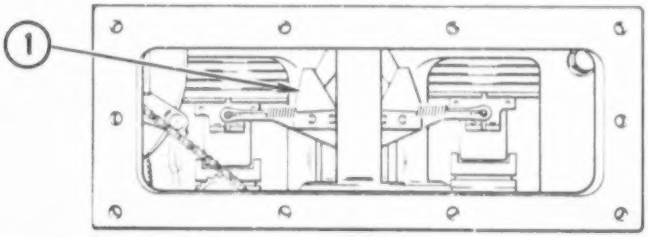
CAUTION

Use care when lifting controller to prevent damage. Keep hands free of internal controller parts. Do not lower controller onto housing unless valve assemblies are all the way in piston assemblies. Damage to equipment can occur.

22. ALINE PIN (3) AND LINK (4).

    a. Repairer and helper partially lower controller assembly (2) onto transmission (5), and aline pin (3) with link (4) by looking through plug hole (6).

    b. Stop lowering controller assembly (2).

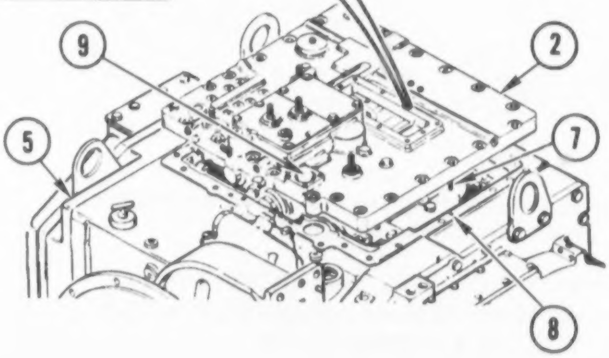


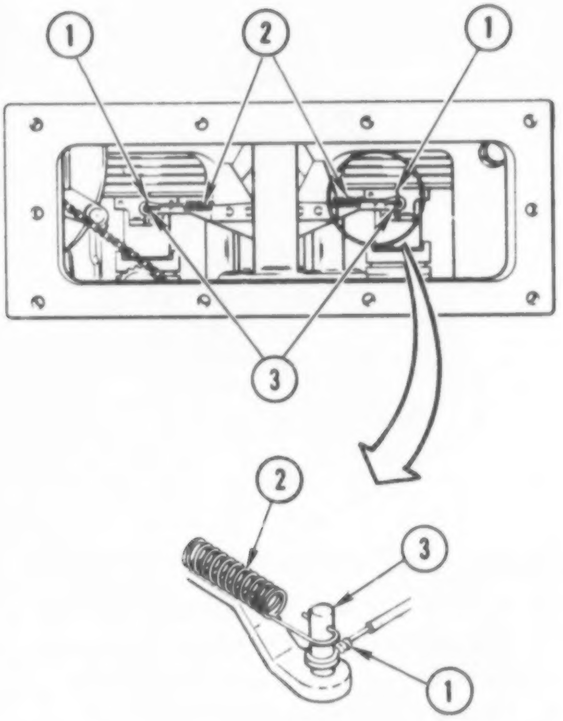
23. REPAIRER AND HELPER INSTALL CONTROLLER ASSEMBLY (2).

    a. Aline steering arm (1).

    b. Aline pins (7) with holes (8) on housing (5) and lower controller assembly (2).

    c. Cover hole (9) with clean rag.





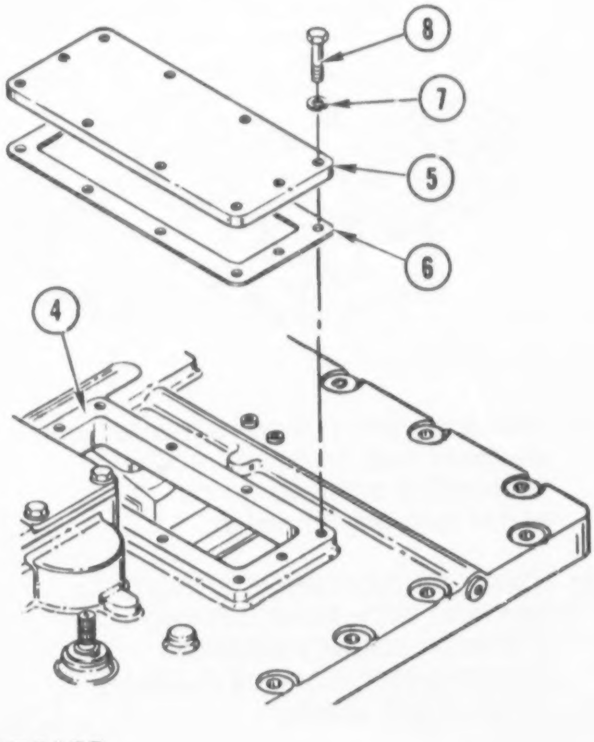
CAUTION

Do not bend springs or actuator valve assemblies. Controller can be damaged.

24. CONNECT TWO ACTUATOR VALVE ASSEMBLIES (1).
    a. Take one spring (2) off each steering arm pin (3).
    b. Connect one actuator valve assembly (1) to each steering arm pin (3).
    c. Connect one spring (2) to each steering arm pin (3).

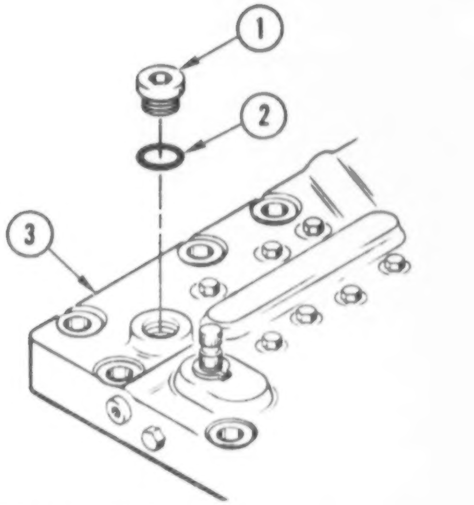
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

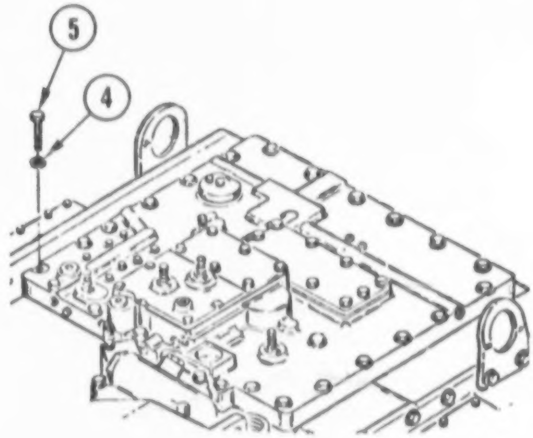


25. CLEAN GASKET MOUNTING SURFACE (4).
    a. Use wiping rag dampened with cleaning solvent.
26. INSTALL COVER (5).
    a. Position new gasket (6) on mounting surface (4).
    b. Position cover (5) on gasket (6).
    c. Install 10 new lock washers (7) and screws (8).

GO TO NEXT PAGE

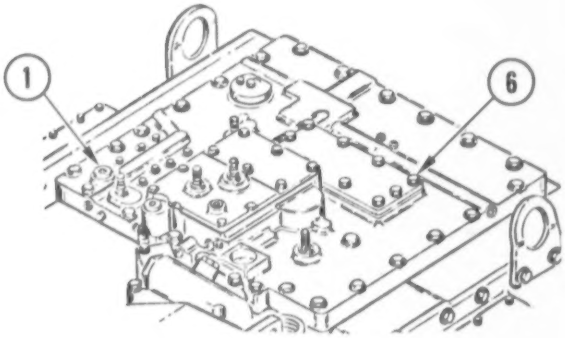


27. INSTALL PLUG (1).
    a. Coat new preformed packing (2) with transmission oil. Put packing on plug (1).
    b. Install plug (1) in controller assembly (3). Hand tighten.



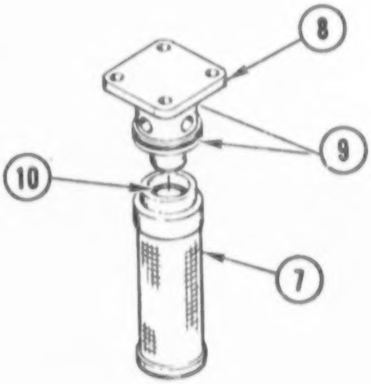
28. INSTALL 24 NEW LOCK WASHERS (4) AND SCREWS (5).

29. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 24 SCREWS (5) TO 25-30 ft-lb (3-4 mkg).

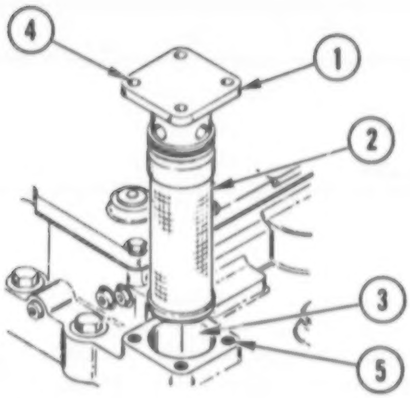


30. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE 10 SCREWS (6) TO 85-110 in-lb (98-127 cmkg).

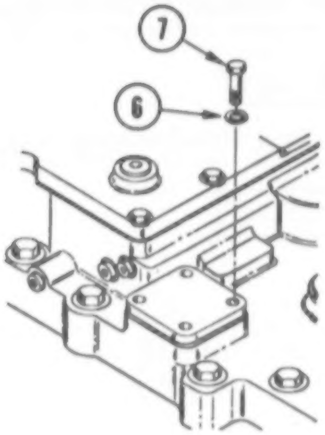
31. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 20-25 ft-lb (3 mkg).



32. INSTALL ELEMENT (7) ON CAP (8).
    a. Coat two new preformed packings (9) and o-ring (10) with transmission oil.
    b. Install two new packings (9) on cap (8).
    c. Install new o-ring (10) in top of element (7).
    d. Install element (7) on cap (8).



33. INSTALL CAP (1) WITH ELEMENT (2).
    - a. Remove rag from hole (3).
    - b. Push cap (1) with element (2) into hole (3) in controller assembly.
    - c. Aline four screw holes (4) in cap (1) with four screw holes (5) in controller assembly.
    - d. Using plastic-faced hammer, tap and seat cap (1) into place.



34. INSTALL FOUR NEW LOCK WASHERS (6) AND SCREWS (7).

35. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (7) TO 85-110 in-lb (98-127 cmkg).

END OF TASK

REPLACE PRESSURE FLUID FILTER

DESCRIPTION

This task covers: Remove (page **3-42**). Install (page **3-43**).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench adapter —
(Item 75, App C)
Socket wrench attachment —
(Item 85, App C)
Torque wrench —
(Item 100, App C)

Materials/Parts:

Cleaning solvent—(Item 1, App B)
Transmission oil—(Item 12, App B)
Preformed packing

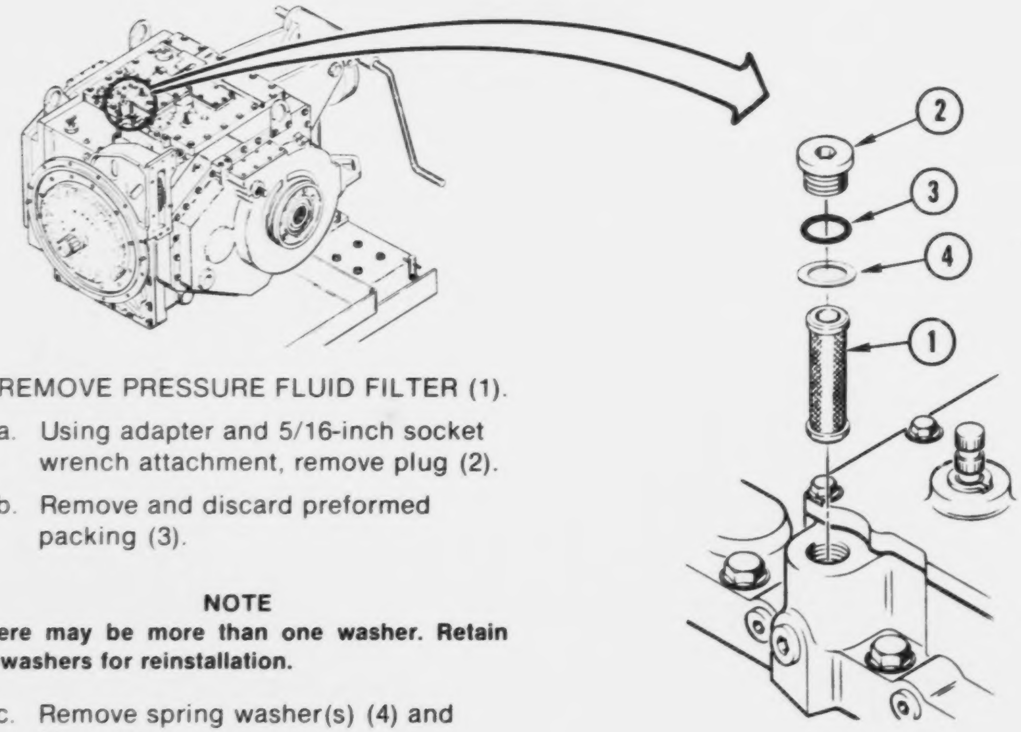
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand.
See page **2-144**.

REMOVE



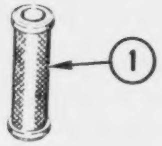
1. REMOVE PRESSURE FLUID FILTER (1).
   a. Using adapter and 5/16-inch socket wrench attachment, remove plug (2).
   b. Remove and discard preformed packing (3).

NOTE
There may be more than one washer. Retain all washers for reinstallation.

   c. Remove spring washer(s) (4) and filter (1).

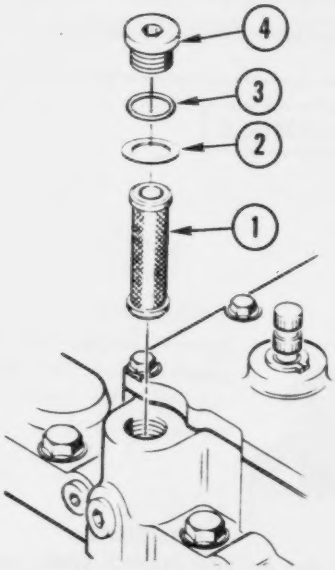
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.



2. CLEAN FILTER (1).
   a. Using cleaning solvent, clean filter (1).

INSTALL



3. INSTALL FILTER (1).
   a. Install filter (1) and spring washer(s) (2).
   b. Coat new preformed packing (3) with transmission oil. Install packing on plug (4).
   c. Using adapter and 5/16-inch socket wrench attachment, install plug (4).
4. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (4) TO 20-25 ft-lb (3 mkg).

END OF TASK

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REPAIR CONTROLLER ASSEMBLY ENCASED SEALS

DESCRIPTION

The controller assembly has five shaft plain encased seals. This task is shown for one seal. It can be used for all five seals. This task covers: Disassemble (page 3-44). Assemble (page 3-45).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Retaining-ring pliers — (Item 60, App C)
Shaft-seal driver — (Item 68, App C)

Materials/Parts:

Cleaning solvent—(Item 1, App B)
Transmission oil—(Item 12, App B)
Wiping rag—(Item 13, App B)

Materials/Parts: (cont)

Plain encased seal (5)
Retaining ring (5)

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

DISASSEMBLE

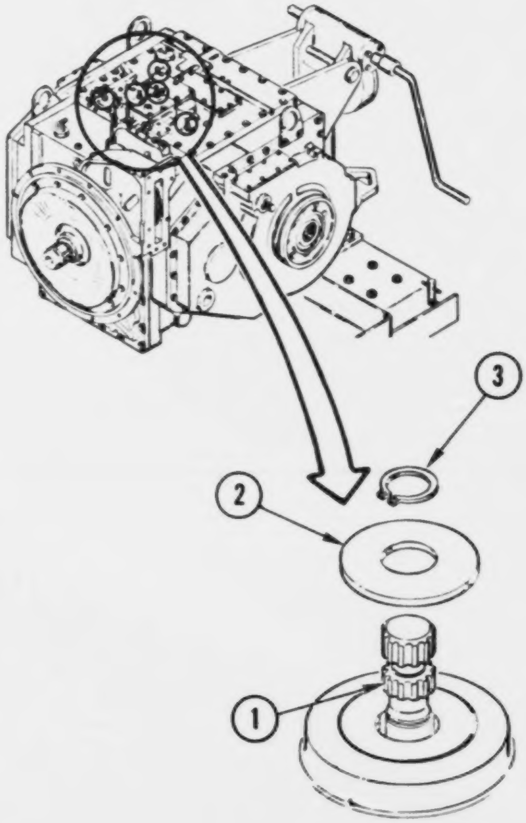
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

CAUTION

Loose dirt on and around shaft can fall into transmission when encased seal is removed. Dirt inside transmission will cause damage.

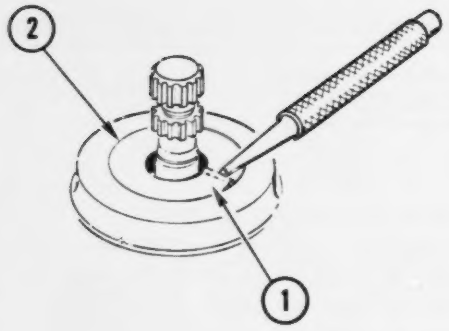
1. CLEAN AREA AROUND SHAFT(S) (1).
   a. Use wiping rag dampened with cleaning solvent.
2. REMOVE WASHER (2).
   a. Using retaining-ring pliers, remove and discard retaining ring (3).
   b. Take off washer (2).



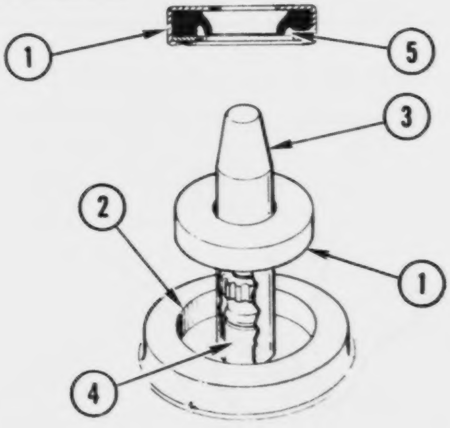
CAUTION

Do not deform shaft or housing. Equipment can be damaged.

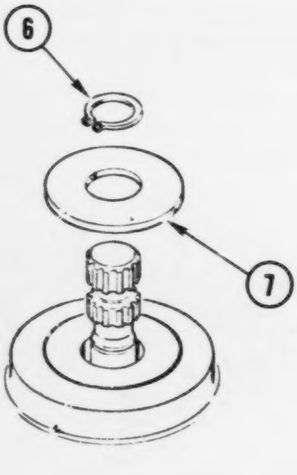
3. REMOVE AND DISCARD SEAL (1).
   - a. Using hammer and drive punch, deform seal (1) so that pliers can grip it.
   - b. Grasp seal (1) and pull from seal well (2).
   - c. Discard seal (1).
4. CLEAN WASHERS, SEAL WELLS, AND SHAFTS. See page 2-2.
5. INSPECT WASHERS, SEAL WELLS, AND SHAFTS. See page 2-5.



ASSEMBLE



6. INSERT NEW SEAL (1).
   - a. Coat new seal (1) with transmission oil.
   - b. Place shaft-seal driver (3) over shaft (4).
   - c. Slide seal (1) over shaft-seal driver (3) with lip (5) facing down.
   - d. Tap seal (1) into seal well (2) until seated flush. Remove shaft-seal driver (3).



7. INSTALL NEW RETAINING RING (6).
   - a. Install washer (7).
   - b. Using retaining-ring pliers, install new retaining ring (6).

END OF TASK

REPAIR CONTROLLER STEERING CONTROL ARM

DESCRIPTION

This task covers: Disassemble (page 3-46). Assemble (page 3-49).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Machinist's vise — (Item 47, App C)
- Micrometer caliper set — (Item 53, App C)

Materials/Parts:

- Lockwire — (Item 5, App B)
- Transmission oil — (Item 12, App B)

Materials/Parts: (cont)

- Cotter pin
- Helical spring (2)

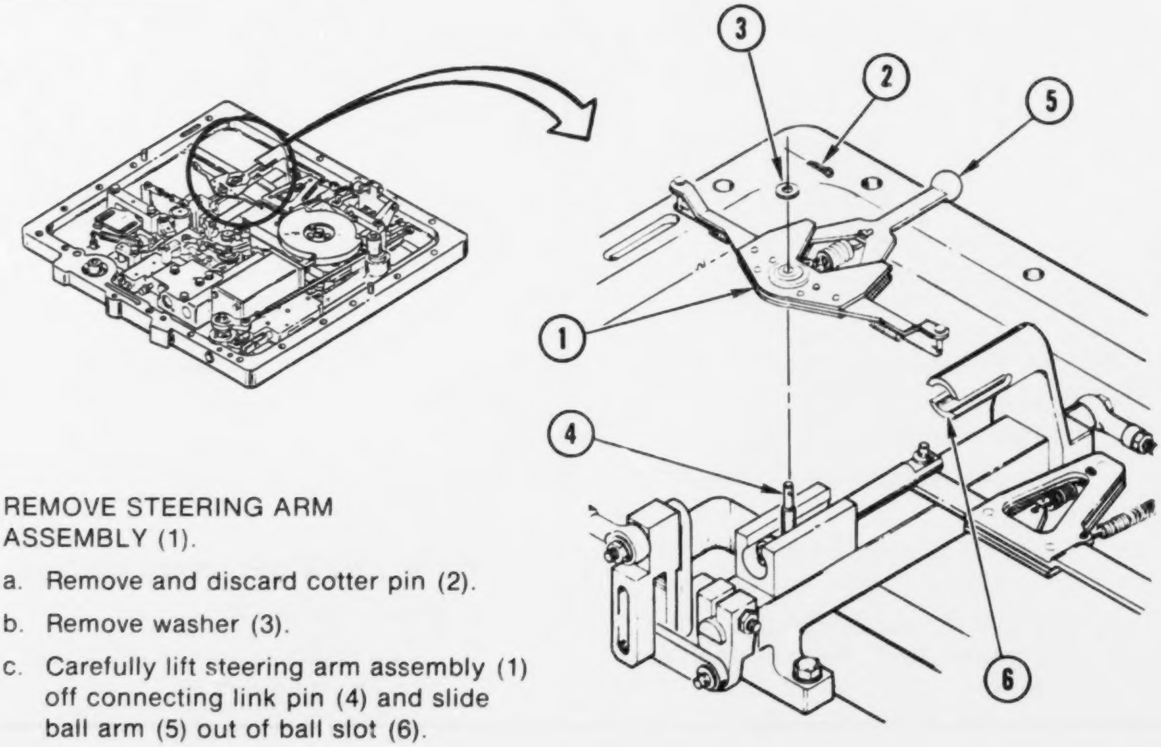
Personnel Required:

- Track Veh Rep 63H10

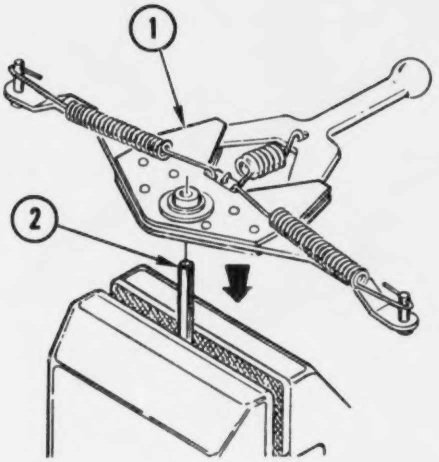
Equipment Conditions:

- Controller assembly on workbench. See page 3-32.

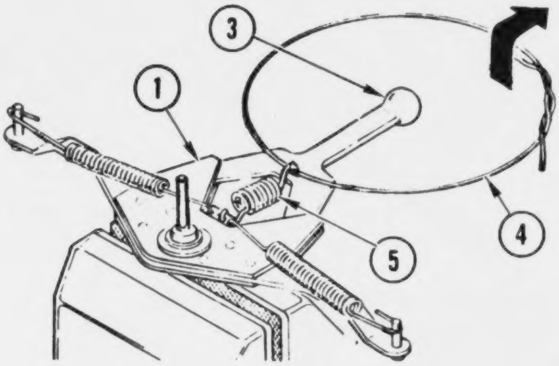
DISASSEMBLE



1. REMOVE STEERING ARM ASSEMBLY (1).
   a. Remove and discard cotter pin (2).
   b. Remove washer (3).
   c. Carefully lift steering arm assembly (1) off connecting link pin (4) and slide ball arm (5) out of ball slot (6).



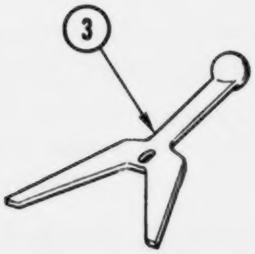
2. PLACE STEERING ARM ASSEMBLY (1) ON PUNCH (2).
   a. Secure 1/8-inch punch (2) in vise.
   b. Place steering arm assembly (1) on punch (2).



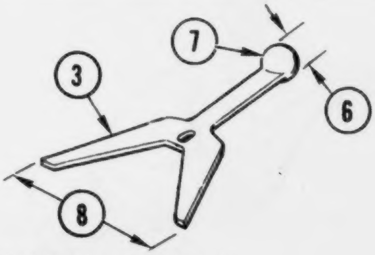
WARNING

Do not allow steering arm to come off punch when disconnecting ball arm spring. Personnel can be injured.

3. DISCONNECT BALL ARM (3).
   a. Thread lockwire (4) through hook of ball arm helical spring (5) and form into loop.
   b. Pull lockwire (4) up and out to release hook of spring (5) from ball arm (3).
   c. Slide ball arm (3) out of steering arm assembly (1).



4. INSPECT BALL ARM (3) FOR WELD CRACKS, SURFACE DAMAGE, OR BENDS.
   a. Replace ball arm (3) if damaged.



5. CHECK BALL ARM (3).
   a. Using micrometer caliper set, measure diameter (6) of ball (7).
   b. Replace ball arm (3) if measurement is less than 0.4997 inch (12.692 mm).
   c. Using indicator caliper, measure distance (8) across y-part of ball arm (3).
   d. Replace ball arm (3) if measurement is less than 2.398 inches (60.91 mm).

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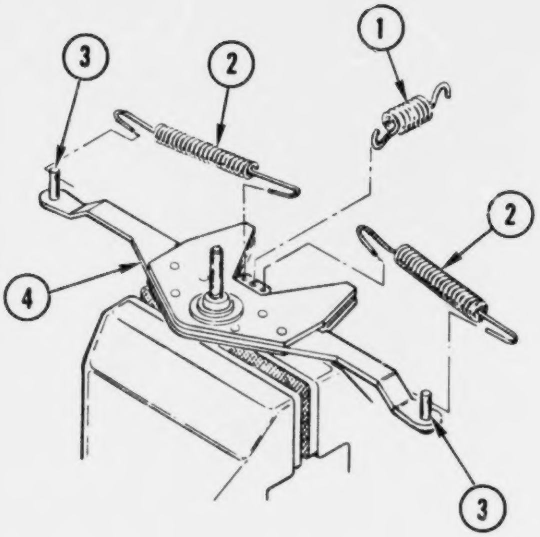
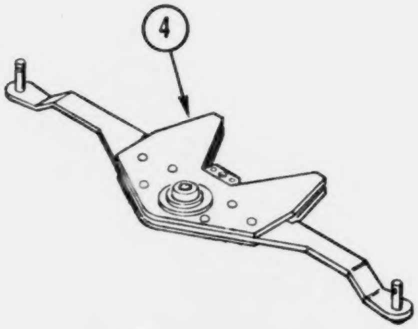
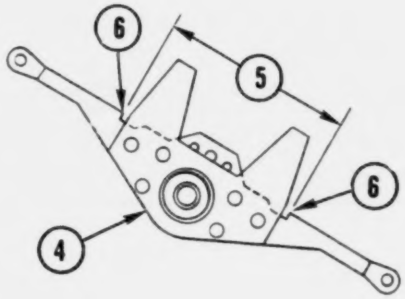


6. REMOVE SPRING (1) AND TWO HELICAL SPRINGS (2).
   a. Unhook and remove spring (1).
   b. Unhook outer ends of each spring (2) from two pins (3).
   c. Unhook and remove inner ends of each spring (2) from steering arm (4). Discard springs (2).
   d. Remove steering arm (4) from punch.



7. INSPECT STEERING ARM (4) FOR CRACKS IN BRAZE JOINTS AND SURFACE DAMAGE.
   a. Replace steering arm (4) if damaged.

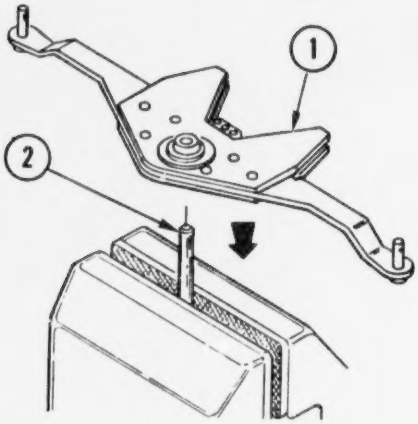


8. CHECK STEERING ARM (4).
   a. Using indicator caliper, measure distance (5) between edges (6).
   b. Replace steering arm (4) if measurement is greater than 2.406 inches (61.11 mm).

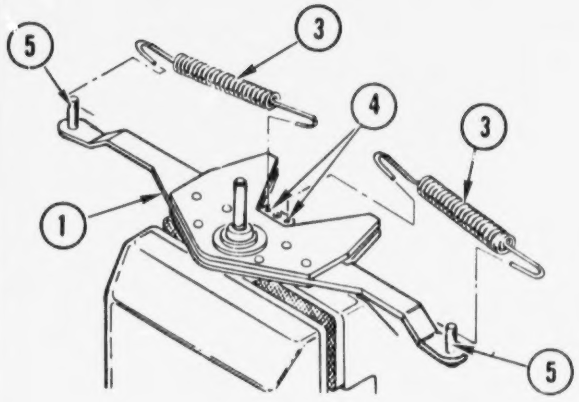
9. CLEAN STEERING ARM ASSEMBLY.
   a. Clean assembly and hardware. See page 2-2.

10. INSPECT STEERING ARM ASSEMBLY.
   a. Inspect assembly and hardware. See page 2-5.

ASSEMBLE



11. PLACE STEERING ARM (1) ON PUNCH (2).
    a. Secure 1/8-inch punch (2) in vise.
    b. Place steering arm (1) on punch (2).



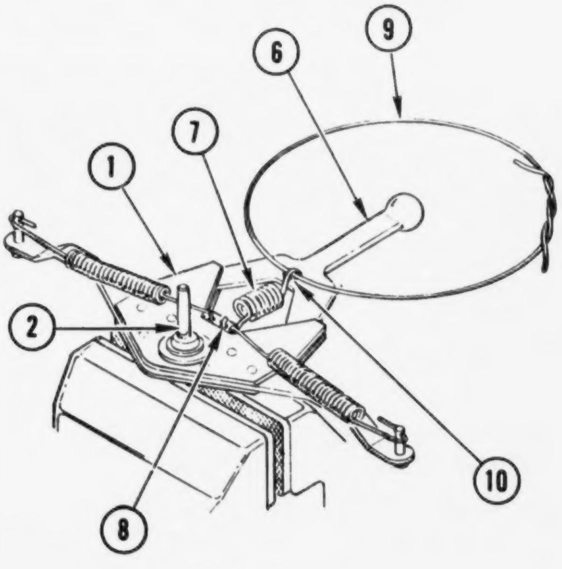
CAUTION
Do not bend spring ends during installation. Equipment can be damaged.

12. INSTALL NEW SPRINGS (3).
    a. Hook one end of spring (3) into hole (4) in steering arm assembly (1).
    b. Hook other end of spring (3) through hole in pin (5).
    c. Repeat steps 12a and 12b for second spring (3).

13. INSTALL BALL ARM (6).
    a. Insert ball arm (6) in steering arm assembly (1).

WARNING
Do not allow steering arm assembly to come off punch when connecting ball arm spring. Personnel can be injured.

14. INSTALL SPRING (7).
    a. Hook spring (7) into hole (8) in steering arm assembly (1).
    b. Loop lockwire (9) through hook of spring (7).
    c. Pull lockwire (9) and spring (7) along ball arm (6) and hook spring into hole (10) in ball arm. Remove lockwire.



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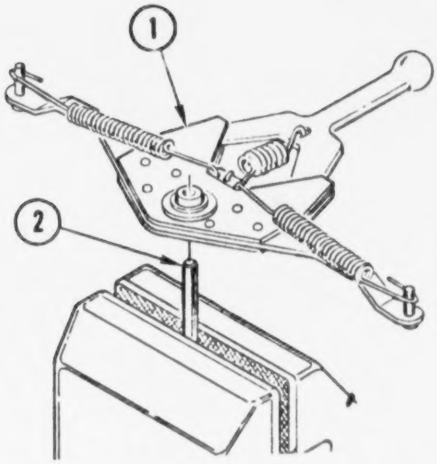
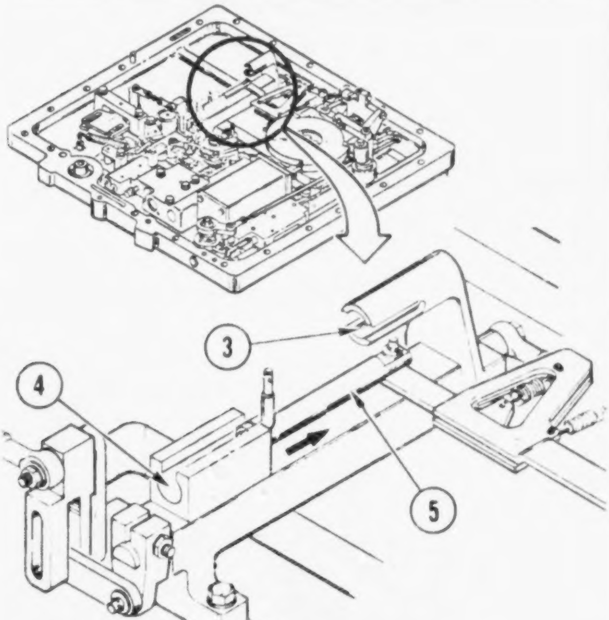
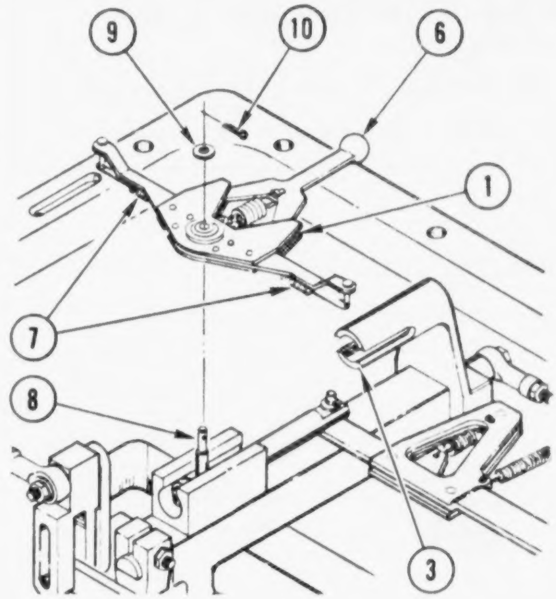


15. REMOVE STEERING ARM ASSEMBLY (1) FROM PUNCH (2).

16. REMOVE PUNCH (2) FROM VISE.



17. CLEAN BALL SLOT (3) AND RIGID CONNECTING LINK SLOT (4).
    a. Slide rigid connecting link (5) out of slot (4).
    b. Flush slots (3) and (4) and link (5) with transmission oil.
    c. Place link (5) back in slot (4).



18. INSTALL STEERING ARM ASSEMBLY (1).
    a. Slide ball of bail arm (6) into ball slot (3) with springs (7) facing down.
    b. Lower steering arm assembly (1) onto pin (8).
    c. Install washer (9) and new cotter pin (10).

END OF TASK

CHAPTER 4

INTERMEDIATE GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. TRANSMISSION ASSEMBLY

TASK INDEX

Task Page

Replace Hoses and Plugs 4-2

Replace Input Idler Spur Gear Assembly 4-45

Replace Disconnect Clutch 4-52

Replace Priority Valve Piston 4-61

Replace Pressure Relief Valve 4-65

Inspect Transmission for Contamination 4-67

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE HOSES AND PLUGS

DESCRIPTION

This task covers the following subtasks:

Subtask	Page
REPLACE HOSE ASSEMBLIES 11627588-14 AND 11628453-6	4-3
REPLACE HOSE ASSEMBLY 11627588-15	4-7
REPLACE HOSE ASSEMBLIES 11628453-3, 11629168-6, AND 11629168-9	4-9
REPLACE HOSE ASSEMBLY 11629168-2	4-14
REPLACE HOSE ASSEMBLY 11628453-7	4-15
REPLACE HOSE ASSEMBLY 11629168-7	4-17
REPLACE HOSE ASSEMBLIES 11629168-1, 11629168-3, AND 11629168-10	4-19
REPLACE HOSE ASSEMBLY 11629168-5	4-25
REPLACE HOSE ASSEMBLY 11627588-11	4-31
REPLACE PLUGS 11627748-23, 11627748-25, (2) 11627748-27, AND 11627748-29 ON LEFT-HAND SIDE OF TRANSMISSION HOUSING	4-35
REPLACE PLUGS 11627748-21, 11627748-23, (3) 11627748-27, 11627748-28, AND 11627748-29 ON RIGHT-HAND SIDE OF TRANSMISSION HOUSING	4-37
REPLACE PLUGS 11627748-21 AND 11627748-28 ON INSIDE OF TRANSMISSION HOUSING	4-39
REPLACE PLUGS 11627748-25 AND 11627748-27 ON BOTTOM OF TRANSMISSION HOUSING	4-41
REPLACE PLUGS (5) 11627748-23, 11627748-25, 11627748-28, AND MS51840-23 ON TOP OF TRANSMISSION HOUSING	4-42

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
Crowfoot attachment — (Item 21, App C)
Crowfoot attachment — (Item 22, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Machinist's vise — (Item 47, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment — (Item 79, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench attachment — (Item 81, App C)

Tools: (cont)

Socket wrench attachment — (Item 82, App C)
Socket wrench attachment — (Item 83, App C)
Socket wrench attachment — (Item 84, App C)
Socket wrench attachment — (Item 86, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Lockwire — (Item 5, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)
- Internal wrench bolt

Materials/Parts: (cont)

- Socket head cap screw (15)
- Transmission repair kit

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

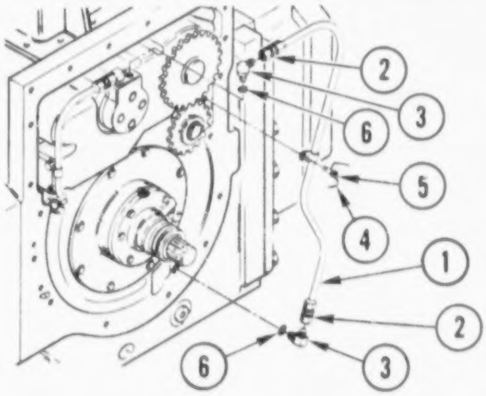
REPLACE HOSE ASSEMBLIES 11627588-14 AND 11628453-6

DESCRIPTION

This subtask covers: Remove (page 4-3). Install (page 4-4).

REMOVE

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.



4. REMOVE HOSE ASSEMBLY 11627588-14 (1).
   a. Disconnect nut (2) from hose to boss elbow (3). Using wire-twister pliers, remove and discard lockwire (4).
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (5). Discard screw.
   c. Disconnect second nut (2) from second hose to boss elbow (3) and remove hose assembly (1).
5. REMOVE TWO ELBOWS (3) AND PREFORMED PACKINGS (6). DISCARD PACKINGS.

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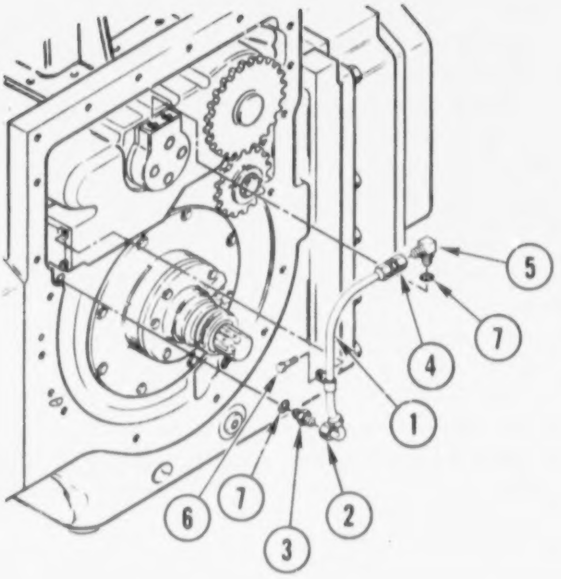
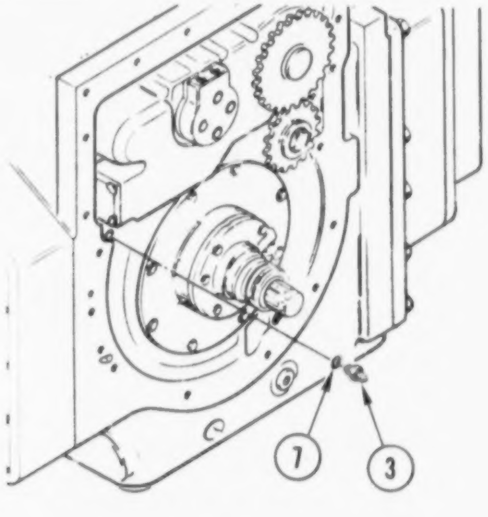
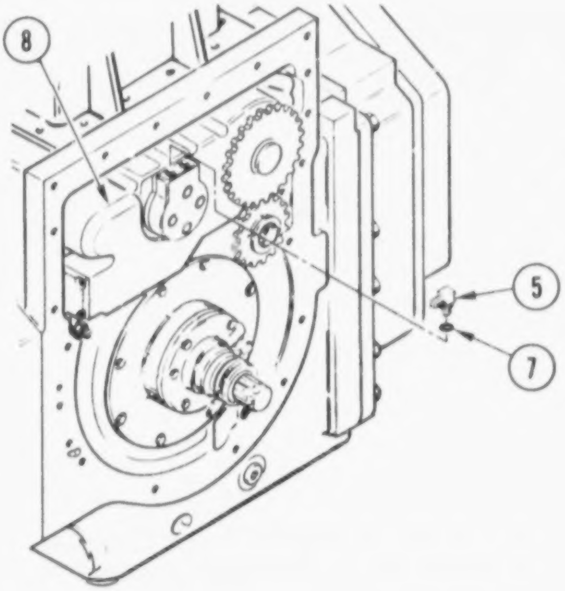
6. REMOVE HOSE ASSEMBLY 11628453-6 (1).
   a. Disconnect nut (2) from adapter (3).
   b. Disconnect nut (4) from hose to boss elbow (5).
   c. Remove screw (6) and hose assembly (1).
7. REMOVE ELBOW (5), ADAPTER (3), AND TWO PREFORMED PACKINGS (7). DISCARD PACKINGS.



INSTALL



8. INSTALL ADAPTER (3).
   a. Coat new preformed packing (7) with transmission oil. Install on adapter (3).
   b. Screw adapter (3) into housing.
9. USING 3/8-INCH TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (3) TO 125-135 in-lb (144-155 cmkg).



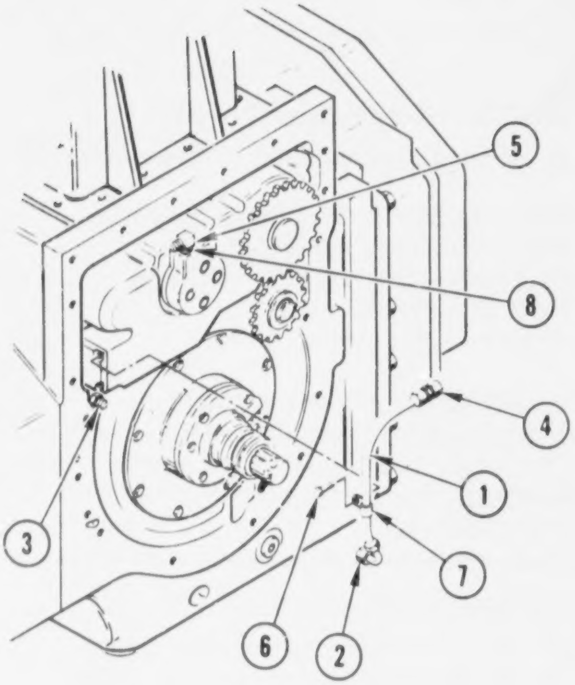
10. INSTALL ELBOW (5).
    a. Coat new preformed packing (7) with transmission oil. Install on elbow (5).
    b. Screw elbow (5) into pump housing (8). Hand tighten until captive washer makes firm contact with pump housing.
    c. Unscrew elbow (5) to position needed for connection to short hose assembly.

11. INSTALL HOSE ASSEMBLY (1).
    - a. Connect hose nut (2) to adapter (3).
    - b. Connect hose nut (4) to elbow (5).
    - c. Install screw (6) through loop clamp (7).

12. HOLD ELBOW (5). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (8) TO 125-135 in-lb (144-155 cmkg).

13. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUTS (2) AND (4) TO 125-135 in-lb (144-155 cmkg).

14. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE SCREW (6) TO 100-120 in-lb (115-138 cmkg).



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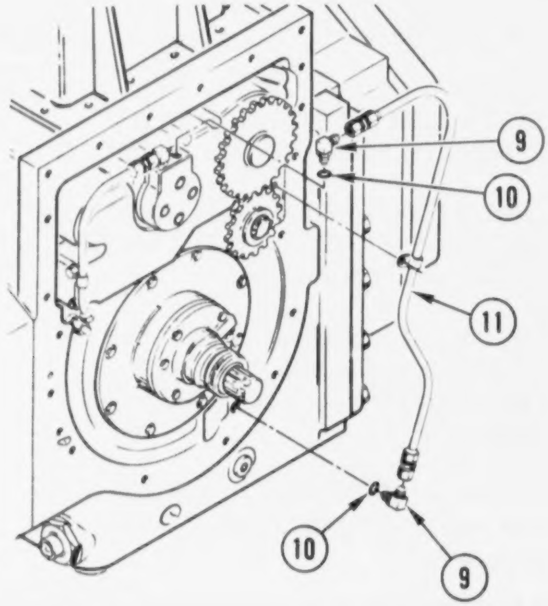
15. INSTALL TWO ELBOWS (9).
    - a. Coat two new preformed packings (10) with transmission oil. Install on elbows (9).
    - b. Screw two elbows (9) into housings. Hand tighten until captive washers make firm contact with housings.
    - c. Unscrew elbows (9) to position needed for connection to long hose assembly (11).



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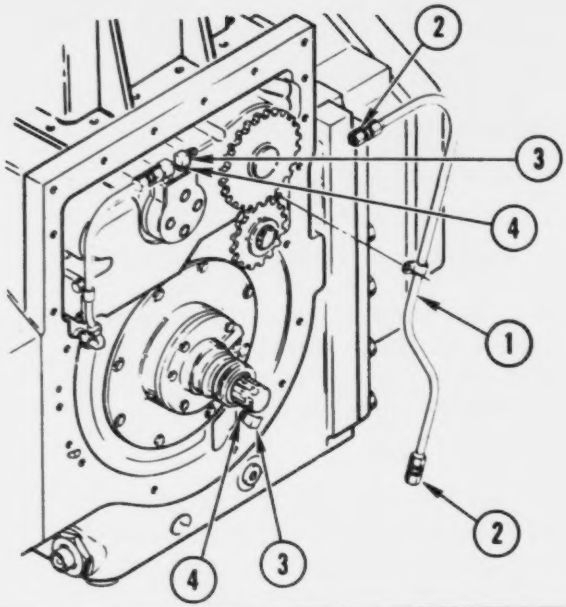
16. INSTALL HOSE ASSEMBLY (1).
    a. Connect two hose nuts (2) to elbows (3).

17. HOLD ELBOWS (3). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO LOCKNUTS (4) TO 125-135 in-lb (144-155 cmkg).

18. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO HOSE NUTS (2) TO 125-135 in-lb (144-155 cmkg).



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19. SECURE HOSE ASSEMBLY (1).
    a. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install clamp (5) and new screw (6).

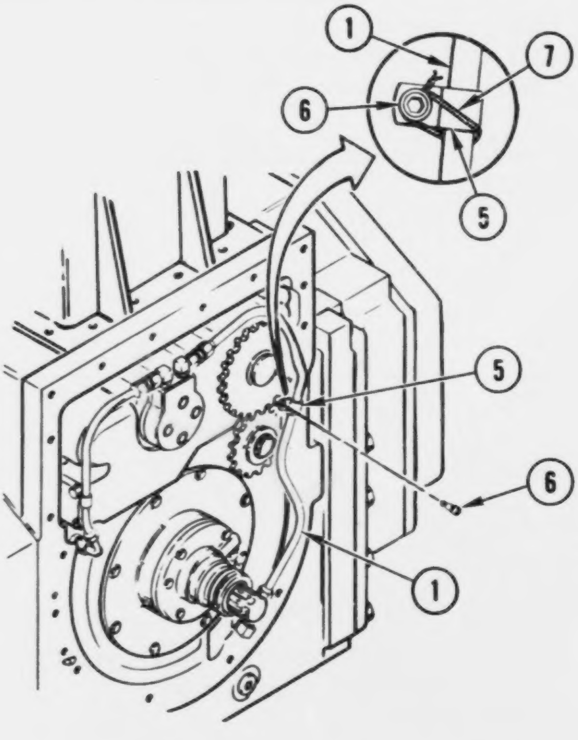
20. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (6) TO 35-45 in-lb (40-52 cmkg).

21. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (7) IN SCREW (6) AND AROUND CLAMP (5).

22. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

23. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

24. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.



END OF SUBTASK

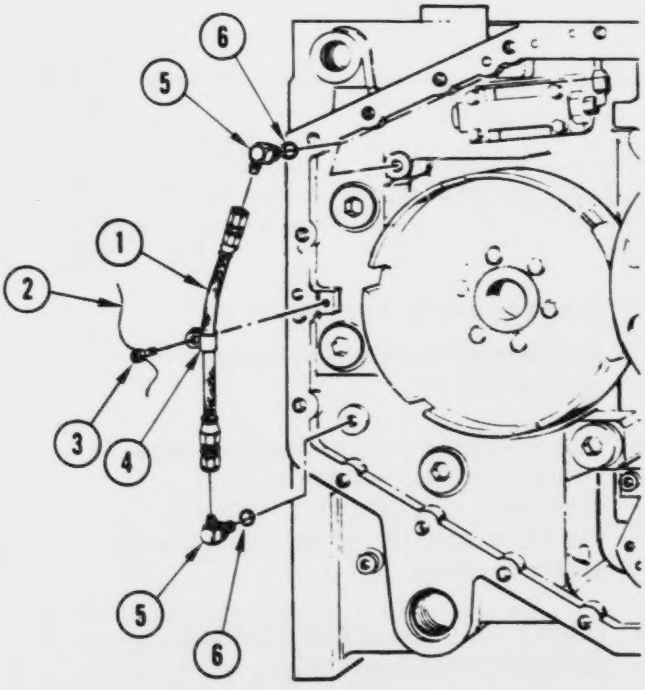
REPLACE HOSE ASSEMBLY 11627588-15

DESCRIPTION

This subtask covers: Remove (page 4-7). Install (page 4-8).

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
3. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.



4. REMOVE HOSE ASSEMBLY 11627588-15 (1).
   a. Using wire-twister pliers, remove lockwire (2). Discard lockwire.
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (3) and loop clamp (4). Discard screw.
   c. Disconnect and remove hose assembly (1).
5. REMOVE TWO HOSE TO BOSS ELBOWS (5) AND PREFORMED PACKINGS (6). DISCARD PACKINGS.

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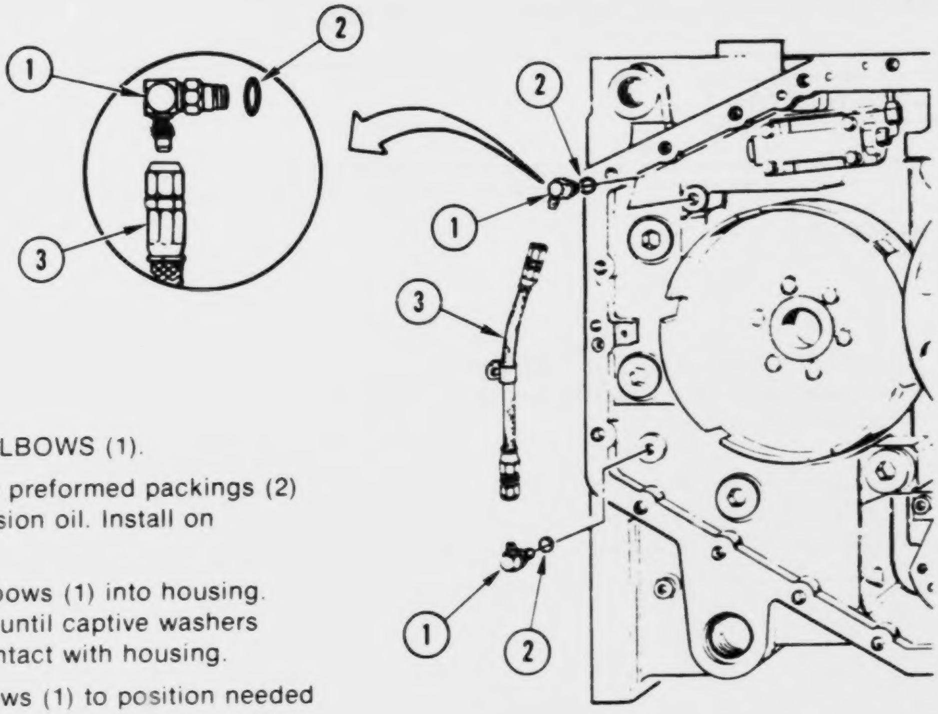
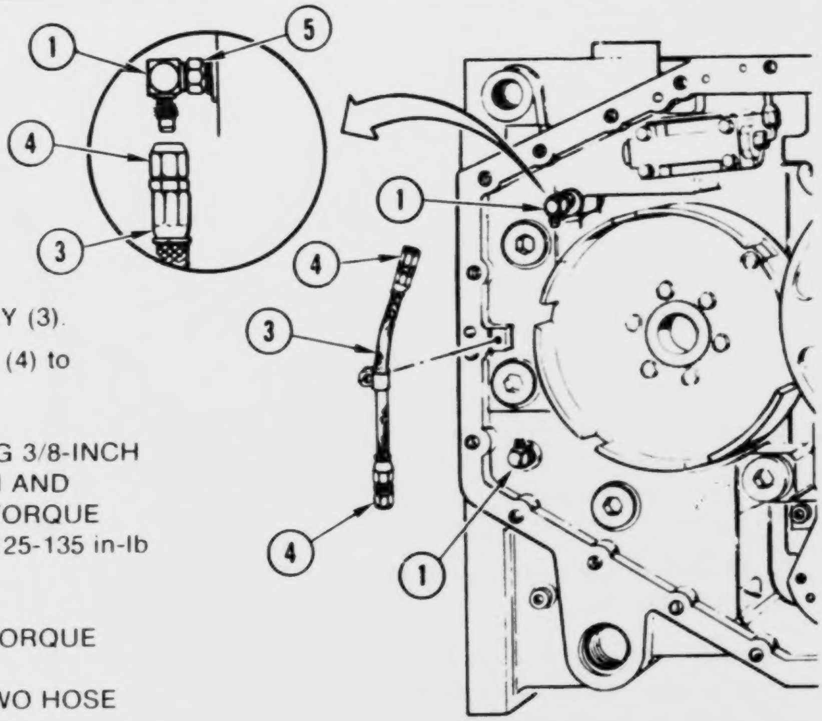
INSTALL

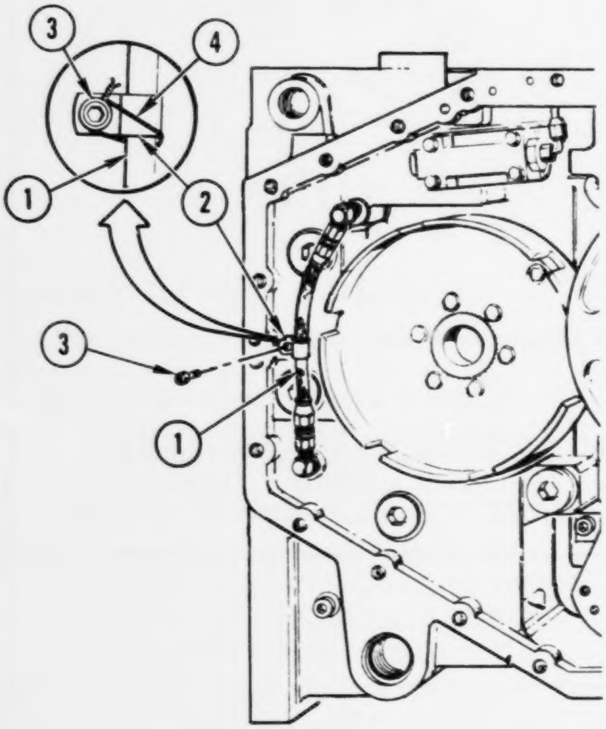


6. INSTALL TWO ELBOWS (1).
   a. Coat two new preformed packings (2) with transmission oil. Install on elbows (1).
   b. Screw two elbows (1) into housing. Hand tighten until captive washers make firm contact with housing.
   c. Unscrew elbows (1) to position needed for connection to hose assembly (3).



7. INSTALL HOSE ASSEMBLY (3).
   a. Connect two hose nuts (4) to elbows (1).
8. HOLD ELBOWS (1). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO LOCKNUTS (5) TO 125-135 in-lb (144-155 cmkg).
9. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO HOSE NUTS (4) TO 125-135 in-lb (144-155 cmkg).

10. SECURE HOSE ASSEMBLY (1).
    a. Position clamp (2). Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new screw (3).
11. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (3) TO 35-45 in-lb (40-52 cmkg).
12. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (4) IN SCREW (3) AND AROUND CLAMP (2).
13. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
14. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
15. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.



END OF SUBTASK

REPLACE HOSE ASSEMBLIES 11628453-3, 11629168-6, AND 11629168-9

DESCRIPTION

This subtask covers: Remove (page 4-9). Install (page 4-11).

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
5. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

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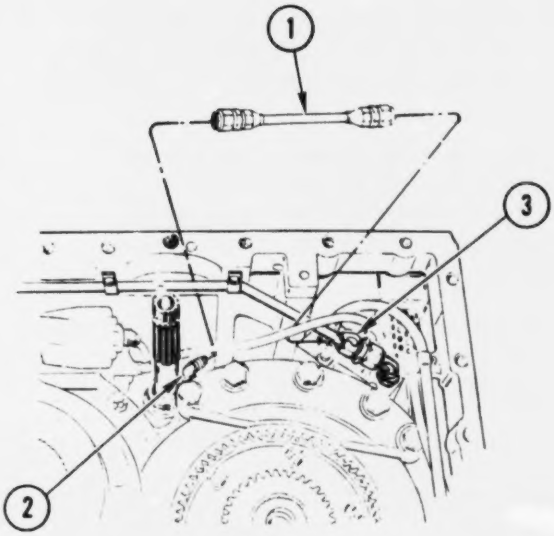
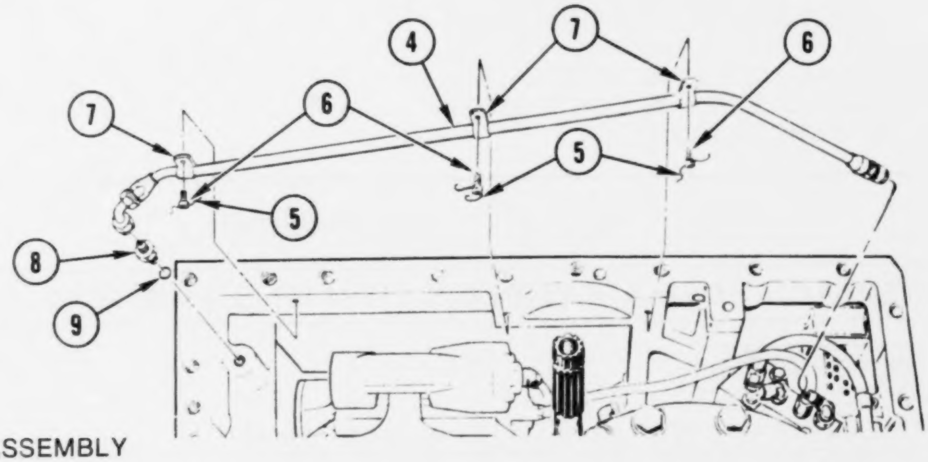
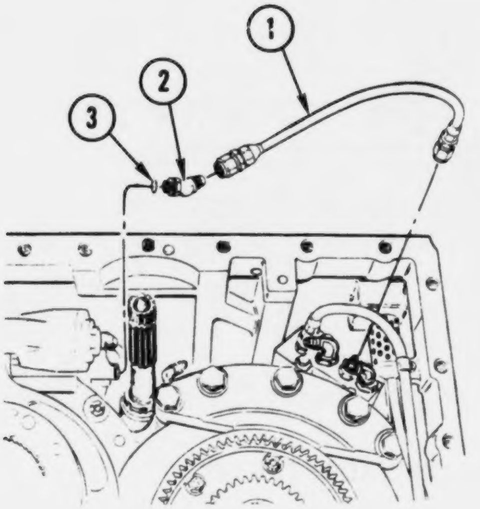


6. DISCONNECT AND REMOVE HOSE ASSEMBLY 11629168-6 (1) FROM HOSE TO BOSS ELBOWS (2) AND (3).



7. REMOVE HOSE ASSEMBLY 11628453-3 (4).
   a. Using wire-twister pliers, remove three lockwires (5). Discard lockwires.
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove three screws (6) and loop clamps (7). Discard screws.
   c. Disconnect and remove hose assembly (4).

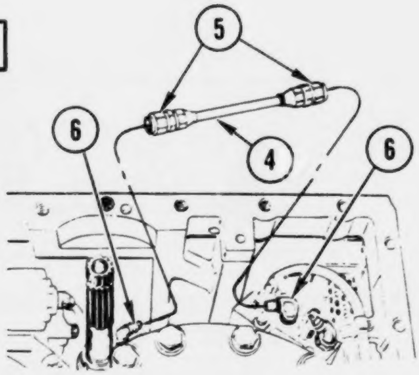
8. REMOVE ADAPTER (8) AND PREFORMED PACKING (9). DISCARD PACKING.



9. DISCONNECT AND REMOVE HOSE ASSEMBLY 11629168-9 (1).

10. REMOVE HOSE TO BOSS ELBOW (2) AND PREFORMED PACKING (3). DISCARD PACKING.

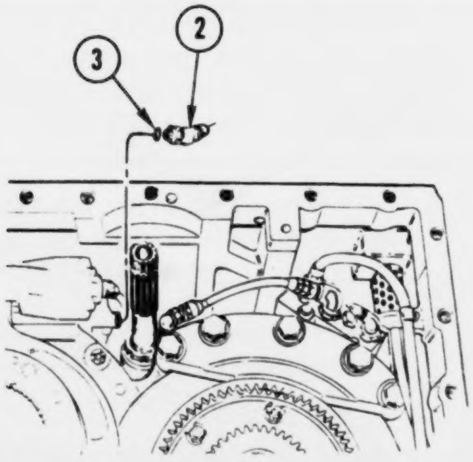
INSTALL



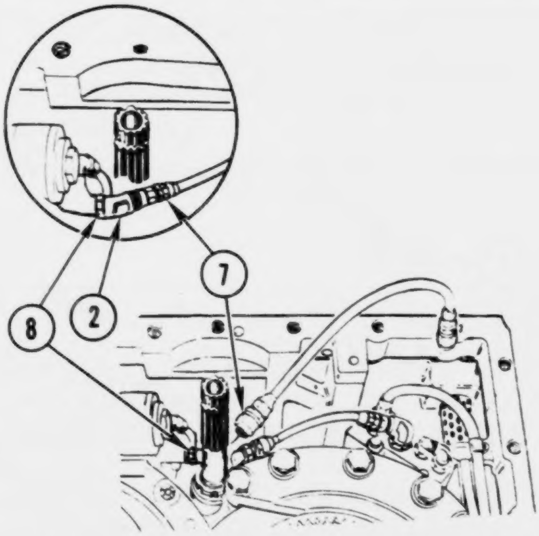
11. INSTALL HOSE ASSEMBLY (4).
    a. Connect two hose nuts (5) to elbows (6).

12. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO ELBOWS (6) TO 125-135 in-lb (144-155 cmkg).

13. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO HOSE NUTS (5) TO 125-135 in-lb (144-155 cmkg).



14. INSTALL 45° ELBOW (2).
    a. Coat new preformed packing (3) with transmission oil. Install on elbow (2).
    b. Screw elbow (2) into housing. Hand tighten until captive washer makes firm contact with housing.
    c. Unscrew elbow (2) to position needed for connection to hose assembly.



15. CONNECT HOSE NUT (7) TO ELBOW (2).

16. HOLD ELBOW (2). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (8) TO 125-135 in-lb (144-155 cmkg).

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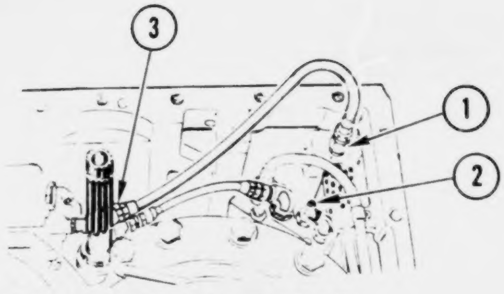
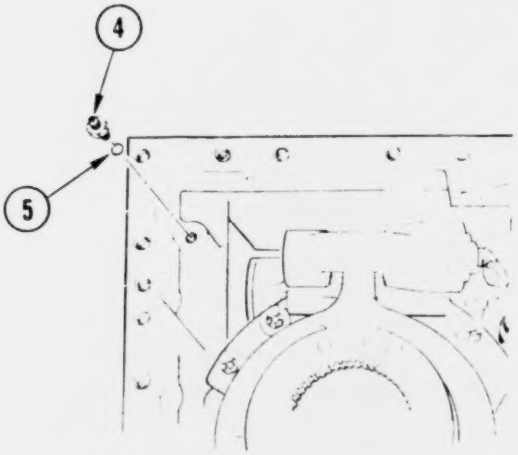


17. CONNECT HOSE NUT (1) TO ADAPTER (2).

18. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (2) TO 125-135 in-lb (144-155 cmkg).

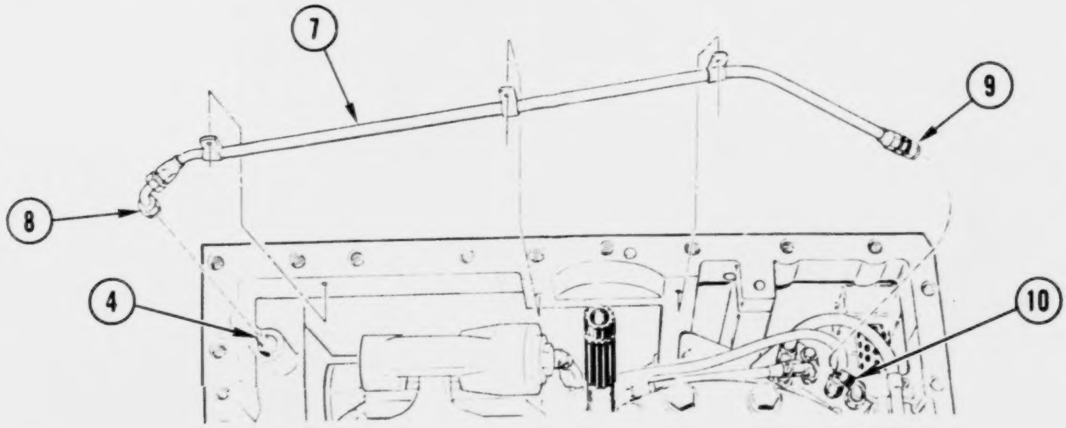
19. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (1) TO 125-135 in-lb (144-155 cmkg).

20. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (3) TO 125-135 in-lb (144-155 cmkg).



21. INSTALL ADAPTER (4).
    a. Coat new preformed packing (5) with transmission oil. Install on adapter (4).
    b. Screw adapter (4) into housing.

22. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (4) TO 125-135 in-lb (144-155 cmkg).

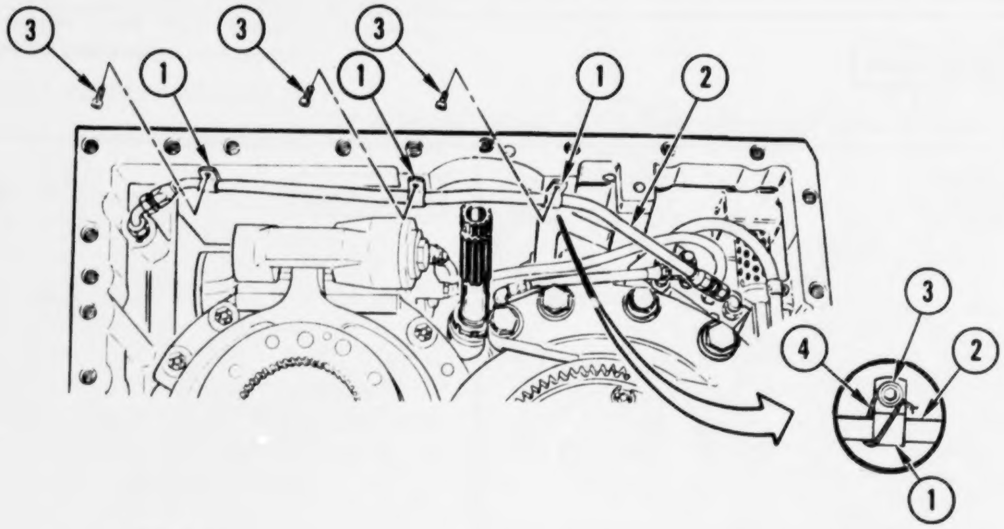


23. INSTALL HOSE ASSEMBLY (7).
    a. Connect hose nut (8) to adapter (4).

24. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (8) TO 125-135 in-lb (144-155 cmkg).

25. CONNECT HOSE NUT (9) TO 45° ELBOW (10).

26. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ELBOW (10) AND HOSE NUT (9) TO 125-135 in-lb (144-155 cmkg).



CAUTION
Clamps must be installed on straight section of hose. Hose must not sag or contact any parts in transmission. Damage to equipment can occur.

27. POSITION THREE CLAMPS (1). PULL HOSE (2) TIGHT BETWEEN CLAMPS. USING 3/8-INCH DRIVE RATCHET HANDLE AND 5/32-INCH SOCKET WRENCH ATTACHMENT, INSTALL THREE NEW SCREWS (3).

28. HOLD HOSE (2) TIGHT BETWEEN CLAMPS (1). USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE THREE SCREWS (3) TO 35-45 in-lb (40-52 cmkg).

29. USING WIRE-TWISTER PLIERS, INSTALL THREE NEW LOCKWIRES (4) IN SCREWS (3) AND AROUND CLAMPS (1).

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30. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

31. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

32. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

33. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

34. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

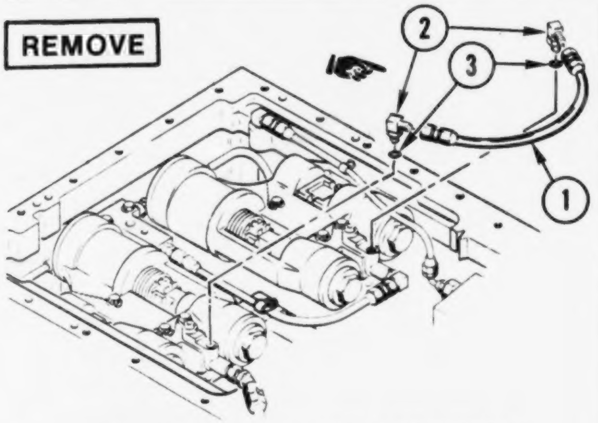
END OF SUBTASK

REPLACE HOSE ASSEMBLY 11629168-2

DESCRIPTION

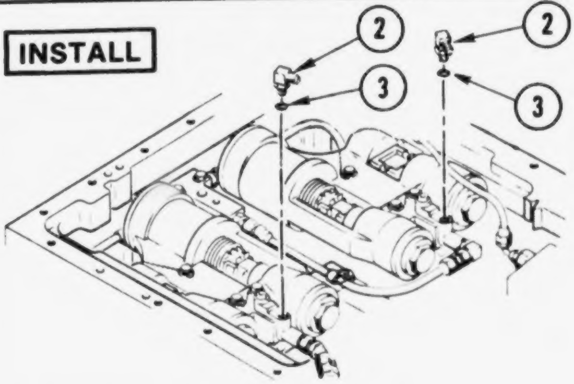
This subtask covers: Remove (page 4-14). Install (page 4-14).

REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. DISCONNECT AND REMOVE HOSE ASSEMBLY 11629168-2 (1).
3. REMOVE TWO HOSE TO BOSS ELBOWS (2) AND PREFORMED PACKINGS (3). DISCARD PACKINGS.

INSTALL



4. INSTALL TWO ELBOWS (2).
   - a. Coat two new preformed packings (3) with transmission oil. Install on elbows (2).
   - b. Screw elbows (2) into housing. Hand tighten until captive washers make firm contact with housing.
   - c. Unscrew elbows (2) to position needed for connection to hose assembly.

CAUTION

Hose must be installed with a smooth even curve and not touch hardware. Damage to equipment can occur.

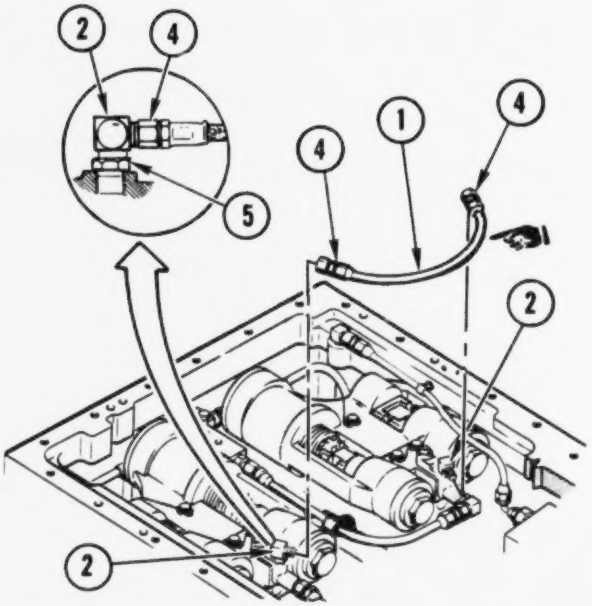
5. INSTALL HOSE ASSEMBLY (1).

   a. Connect two hose nuts (4) to elbows (2).

6. HOLD ELBOWS (2). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO LOCKNUTS (5) TO 125-135 in-lb (144-155 cmkg).

7. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO HOSE NUTS (4) TO 125-135 in-lb (144-155 cmkg).

8. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.



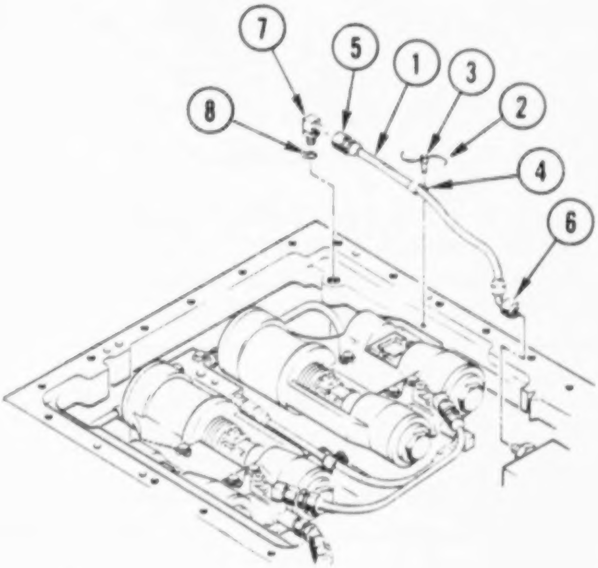
END OF SUBTASK

REPLACE HOSE ASSEMBLY 11628453-7

DESCRIPTION

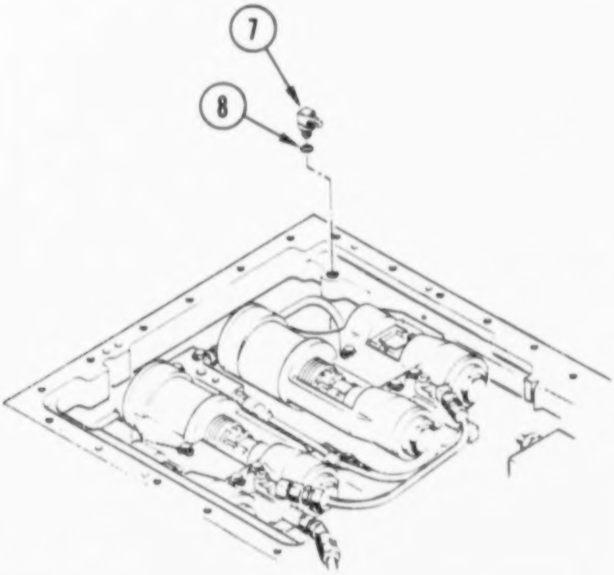
This subtask covers: Remove (page 4-15). Install (page 4-15).

REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE HOSE ASSEMBLY 11628453-7 (1).
   a. Using wire-twister pliers, remove lockwire (2). Discard lockwire.
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (3) and loop clamp (4). Discard screw.
   c. Disconnect hose nuts (5) and (6) and remove hose assembly (1).
3. REMOVE HOSE TO BOSS ELBOW (7) AND PREFORMED PACKING (8). DISCARD PACKING.

INSTALL



4. INSTALL ELBOW (7).
   a. Coat new preformed packing (8) with transmission oil. Install on elbow (7).
   b. Screw elbow (7) into housing. Hand tighten until captive washer makes firm contact with housing.
   c. Unscrew elbow (7) to position needed for connection to hose assembly.

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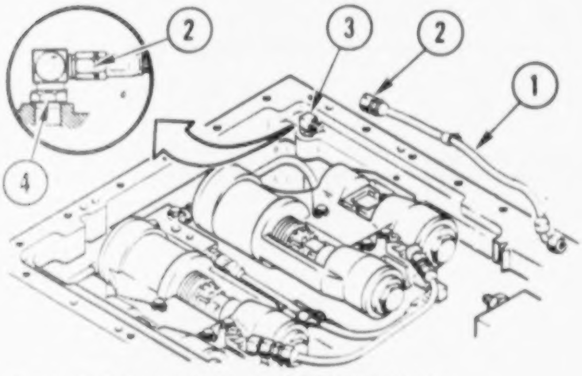
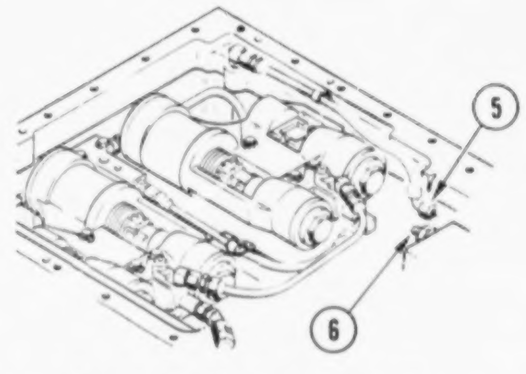


5. INSTALL HOSE ASSEMBLY (1).

   a. Connect hose nut (2) to elbow (3).

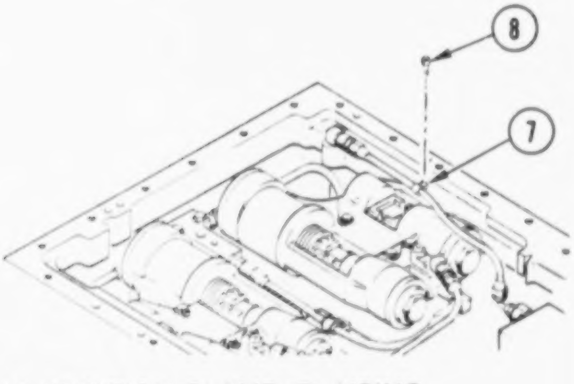
6. HOLD ELBOW (3). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (4) TO 125-135 in-lb (144-155 cmkg).

7. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (2) TO 125-135 in-lb (144-155 cmkg).



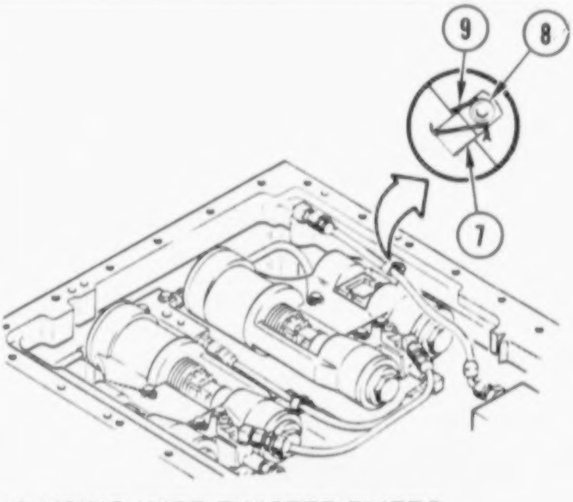
8. CONNECT HOSE NUT (5) TO ADAPTER (6).

9. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (5) TO 125-135 in-lb (144-155 cmkg).



10. POSITION CLAMP (7). USING 3/8-INCH DRIVE RATCHET HANDLE AND 5/32-INCH SOCKET WRENCH ATTACHMENT, INSTALL NEW SCREW (8).

11. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (8) TO 35-45 in-lb (40-52 cmkg).



12. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (9) IN SCREW (8) AND AROUND CLAMP (7).

13. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

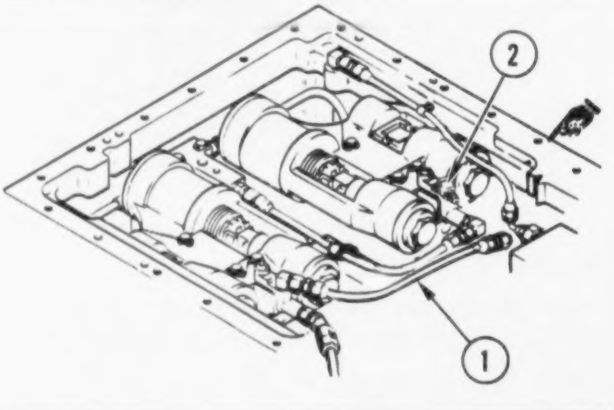
END OF SUBTASK

REPLACE HOSE ASSEMBLY 11629168-7

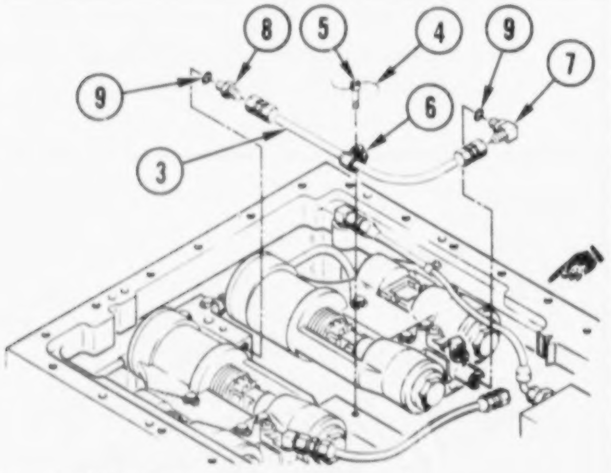
DESCRIPTION

This subtask covers: Remove (page 4-17). Install (page 4-17).

REMOVE

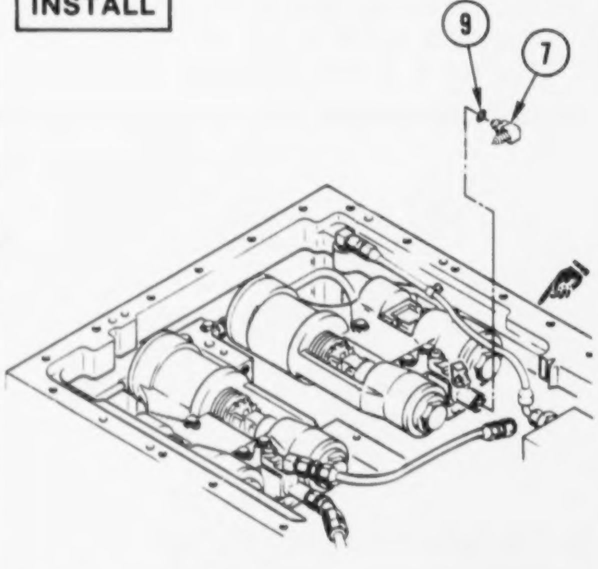


1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. DISCONNECT HOSE ASSEMBLY (1) FROM RIGHT-HAND HYDRAULIC ASSEMBLY (2).



3. REMOVE HOSE ASSEMBLY 11629168-7 (3).
   a. Using wire-twister pliers, remove lockwire (4). Discard lockwire.
   b. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove screw (5) and loop clamp (6). Discard screw.
   c. Disconnect and remove hose assembly (3).
4. REMOVE HOSE TO BOSS ELBOW (7), ADAPTER (8), AND TWO PREFORMED PACKINGS (9). DISCARD PACKINGS.

INSTALL



5. INSTALL ELBOW (7).
   a. Coat new preformed packing (9) with transmission oil. Install on elbow (7).
   b. Screw elbow (7) into housing. Hand tighten until captive washer makes firm contact with housing.
   c. Unscrew elbow (7) to position needed for connection to hose assembly.

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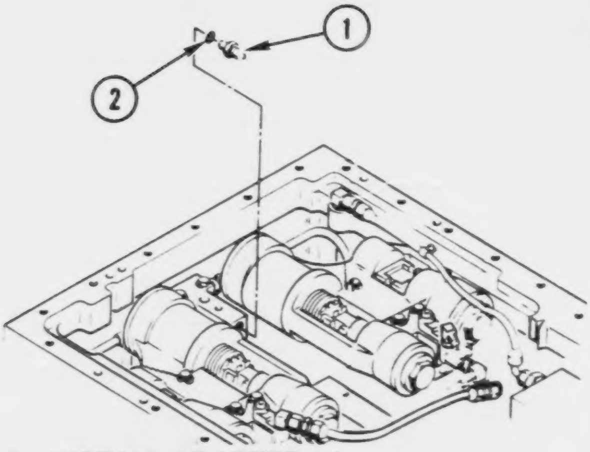
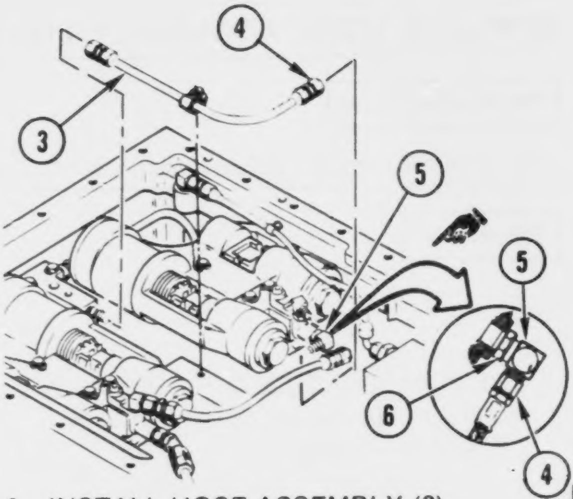
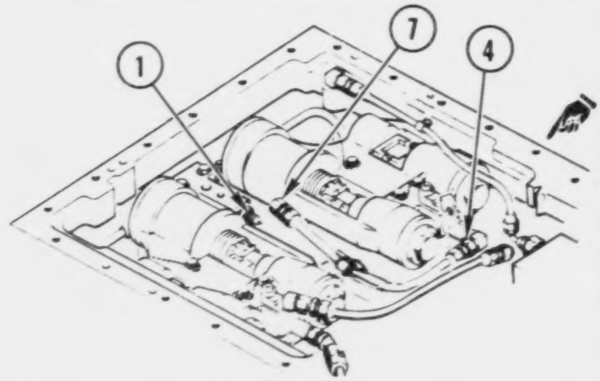


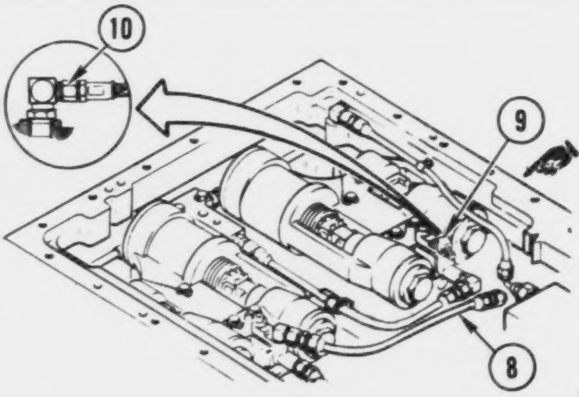
6. INSTALL ADAPTER (1).
    - a. Coat new preformed packing (2) with transmission oil. Install on adapter (1).
    - b. Screw adapter (1) into housing.
7. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/8-INCH CROWFOOT, TORQUE ADAPTER (1) TO 125-135 in-lb (144-155 cmkg).



8. INSTALL HOSE ASSEMBLY (3).
    - a. Connect hose nut (4) to elbow (5).
9. HOLD ELBOW (5). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (6) TO 125-135 in-lb (144-155 cmkg).



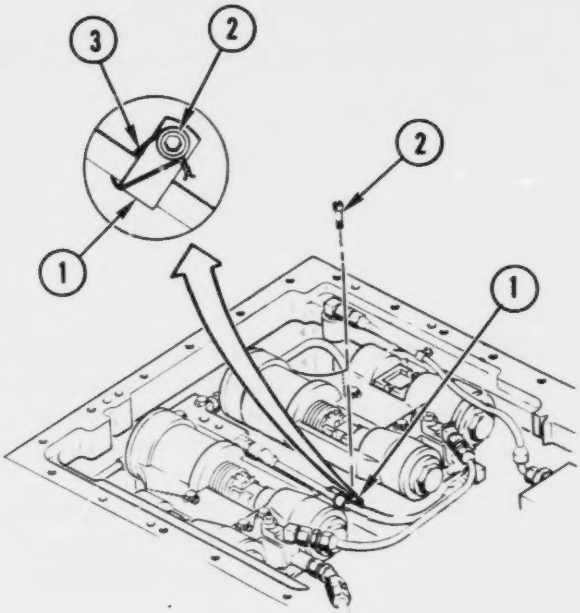
10. CONNECT HOSE NUT (7) TO ADAPTER (1).
11. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (7) TO 125-135 in-lb (144-155 cmkg).
12. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (4) TO 125-135 in-lb (144-155 cmkg).



CAUTION

Hose must be installed with a smooth even curve and not touch hardware. Damage to equipment can occur.

13. CONNECT HOSE ASSEMBLY (8) TO RIGHT-HAND HYDRAULIC ASSEMBLY (9).
14. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (10) TO 125-135 in-lb (144-155 cmkg).



15. POSITION CLAMP (1).

16. USING 3/8-INCH DRIVE RATCHET HANDLE AND 3/16-INCH SOCKET WRENCH ATTACHMENT, INSTALL NEW SCREW (2).

17. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (2) TO 35-45 in-lb (40-52 cmkg).

18. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (3) IN SCREW (2) AND AROUND CLAMP (1).

19. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF SUBTASK

REPLACE HOSE ASSEMBLIES 11629168-1, 11629168-3, AND 11629168-10

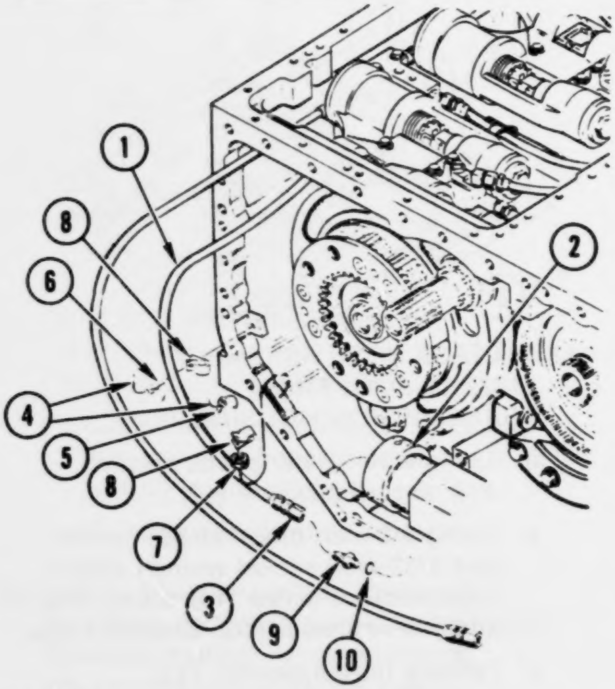
DESCRIPTION

This subtask covers: Remove (page 4-19). Install (page 4-21).

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

8. DISCONNECT HOSE ASSEMBLY (1) FROM HYDRAULIC ACCUMULATOR (2).
   a. Unscrew nut (3).
9. RELEASE HOSE ASSEMBLY 11629168-10 (1).
   a. Using wire-twister pliers, remove and discard two lockwires (4).
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove bolt (5), screw (6), and sleeve spacer (7). Discard screw and bolt.
   c. Spread open and pull off two loop clamps (8).
10. REMOVE ADAPTER (9) AND PREFORMED PACKING (10). DISCARD PACKING.



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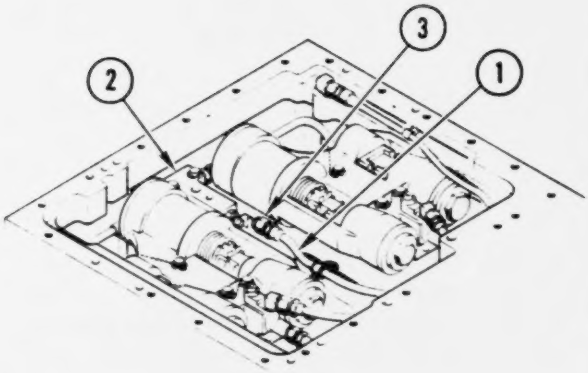
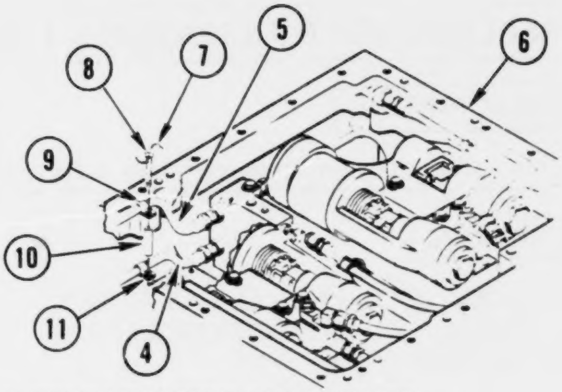
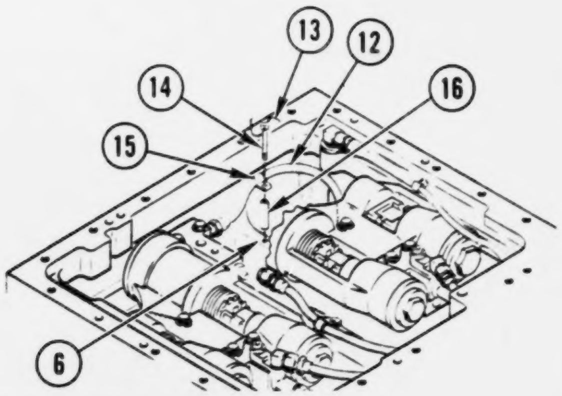


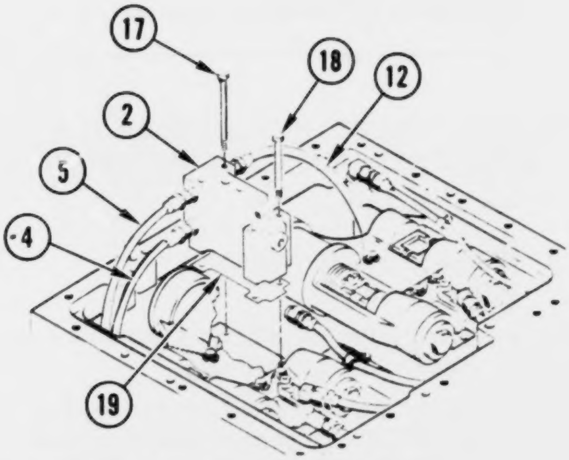
11. DISCONNECT HOSE ASSEMBLY 11629168-7 (1) FROM FIRST RANGE RELAY VALVE ASSEMBLY (2).
    a. Unscrew nut (3).



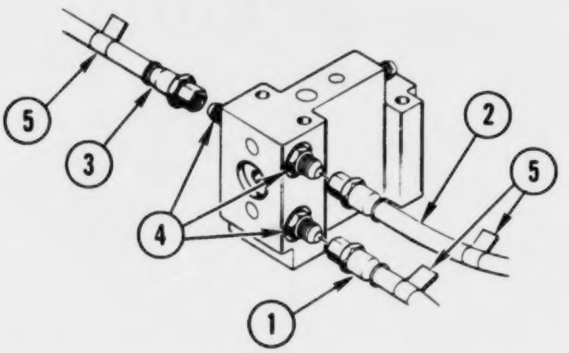
12. RELEASE HOSE ASSEMBLIES 11629168-1 (4) AND 11629168-10 (5) FROM TRANSMISSION HOUSING (6).
    a. Using wire-twister pliers, remove and discard lockwire (7).
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (8), clamp (9), sleeve spacer (10), and second clamp (11). Discard screw.
    c. Release hose assemblies (4) and (5).



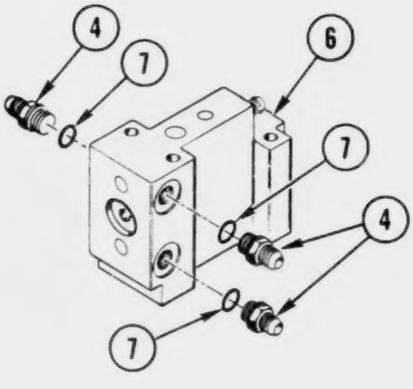
13. RELEASE HOSE ASSEMBLY 11629168-3 (12) FROM TRANSMISSION HOUSING (6).
    a. Using wire-twister pliers, remove and discard lockwire (13).
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (14), clamp (15), and sleeve spacer (16). Discard screw.
    c. Release hose assembly (12).



14. REMOVE VALVE ASSEMBLY (2).
    a. Using 3/8-inch drive ratchet handle and 7/16-inch socket, remove two long screws (17) and two short screws (18).
    b. Lift out valve assembly (2) with hoses (4), (5), and (12).
    c. Remove and discard relay valve assembly gasket (19).

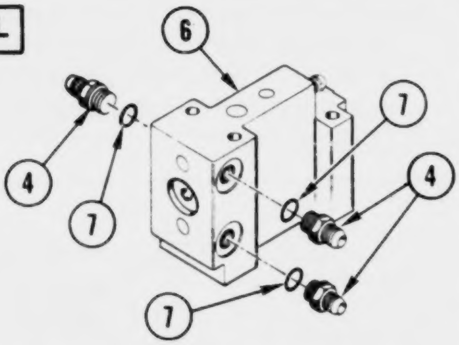


15. DISCONNECT HOSE ASSEMBLIES 11629168-10 (1), 11629168-1 (2), AND 11629168-3 (3) FROM ADAPTERS (4).
    a. Place identification tags (5) on hose assemblies (1), (2), and (3).
    b. Disconnect hose assemblies.



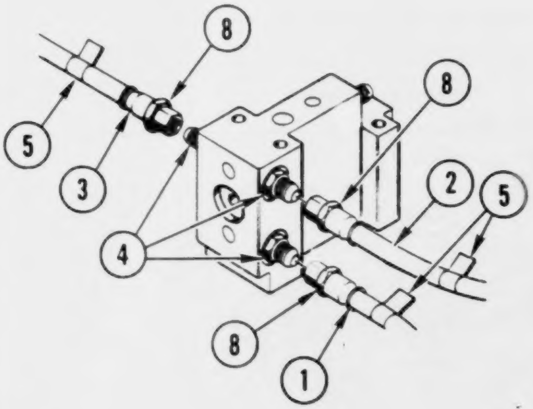
16. REMOVE THREE ADAPTERS (4) FROM VALVE ASSEMBLY (6).
    a. Place valve assembly (6) in vise.
    b. Remove three adapters (4).
    c. Remove and discard three preformed packings (7).

INSTALL



17. INSTALL THREE ADAPTERS (4) IN VALVE ASSEMBLY (6).
    a. Place valve assembly (6) in vise.
    b. Coat three new preformed packings (7) with transmission oil.
    c. Install packing (7) on each of three adapters (4).
    d. Install three adapters (4) in valve assembly (6).

18. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE THREE ADAPTERS (4) TO 125-135 in-lb (144-155 cmkg).
    a. Remove valve assembly (6) from vise.



19. CONNECT HOSE ASSEMBLIES 11629168-10 (1), 11629168-1 (2), AND 11629168-3 (3) TO ADAPTERS (4).
    a. Using identification tags (5) for position, connect hose assemblies (1), (2), and (3) to adapters (4).
    b. Remove identification tags (5).

20. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE THREE HOSE NUTS (8) TO 125-135 in-lb (144-155 cmkg).

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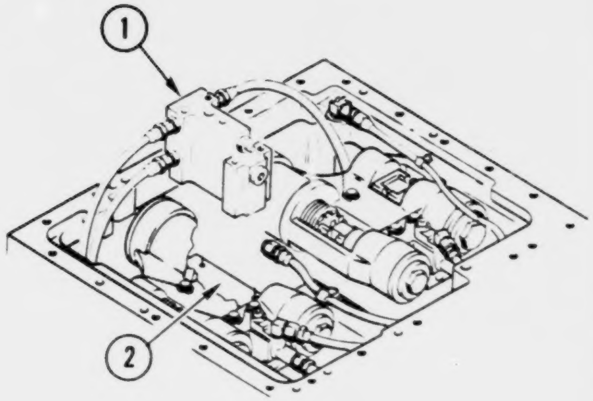
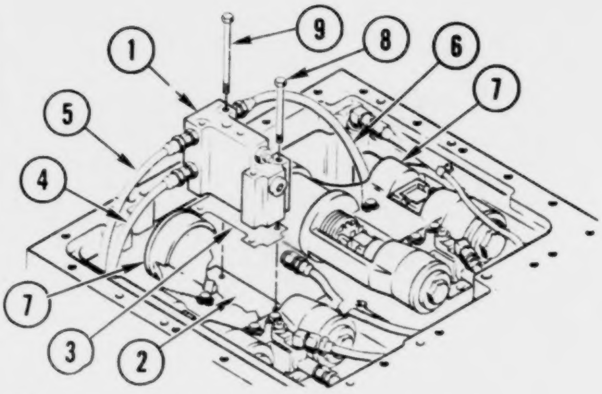


WARNING

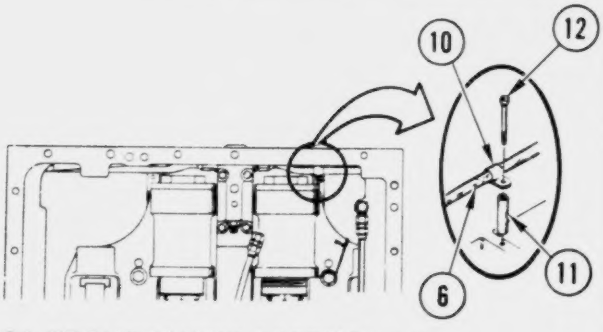
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

21. CLEAN GASKET MOUNTING SURFACE OF VALVE ASSEMBLY (1) AND HOUSING (2).
    a. Use wiping rag dampened with cleaning solvent.



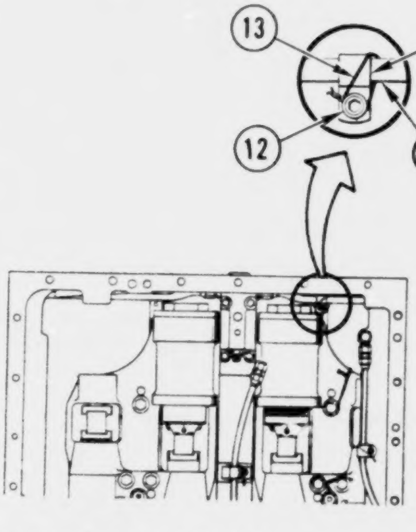
22. INSTALL VALVE ASSEMBLY (1).
    a. Position new gasket (3) and valve assembly (1) on housing (2).
    b. Feed hose assemblies (4), (5), and (6) behind two actuator assemblies (7).
    c. Install two short screws (8) and two long screws (9).

23. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (8) AND TWO SCREWS (9) TO 120-145 in-lb (138-167 cmkg).

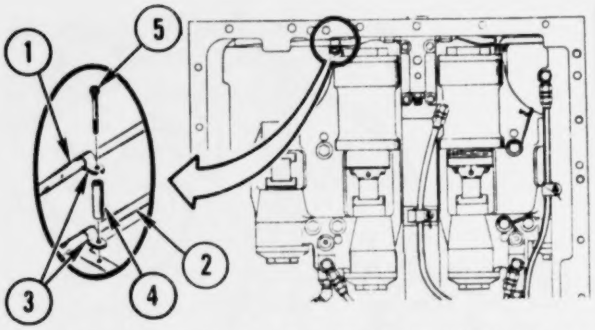


24. SECURE HOSE ASSEMBLY (6).
    a. Install clamp (10) and spacer (11).
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new screw (12).

25. USING 3/8-INCH DRIVE TORQUE WRENCH, 6-INCH EXTENSION, AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (12) TO 35-45 in-lb (40-52 cmkg).

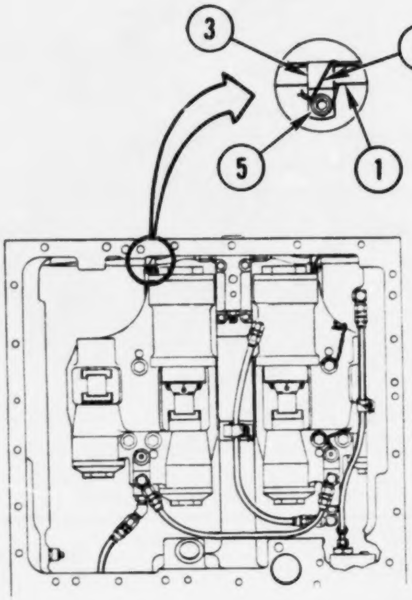


26. INSTALL LOCKWIRE (13).
    a. Using wire-twister pliers, install lockwire (13) through screw (12), around hose assembly (6), and clamp (10).

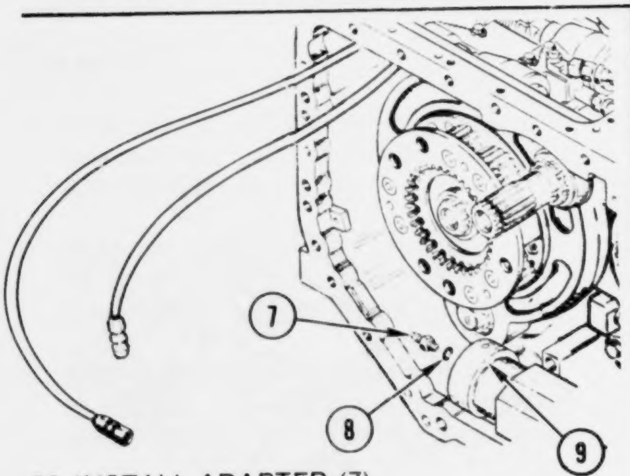


27. SECURE TWO HOSE ASSEMBLIES (1) AND (2).
    a. Install two clamps (3) and spacer (4).
    b. Using 3/8-inch drive ratchet handle, 6-inch extension, and 5/32-inch socket wrench attachment, install new screw (5) through clamp (3), spacer (4), and second clamp (3).

28. USING 3/8-INCH DRIVE TORQUE WRENCH, 6-INCH EXTENSION, AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (5) TO 35-45 in-lb (40-52 cmkg).

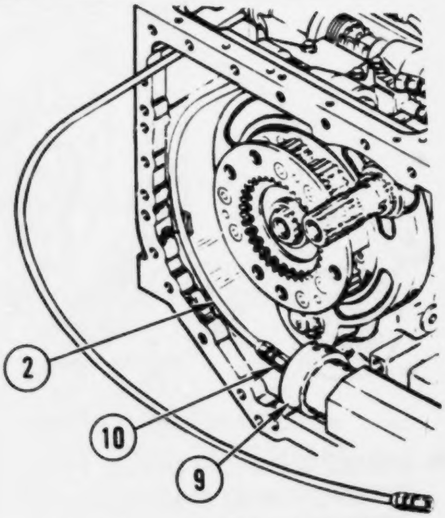


29. INSTALL LOCKWIRE (6).
    a. Using wire-twister pliers, install lockwire (6) through screw (5), around hose assembly (1), and clamp (3).



30. INSTALL ADAPTER (7).
    a. Coat new preformed packing (8) with transmission oil. Install on adapter (7).
    b. Screw adapter (7) into accumulator (9).

31. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/8-INCH CROWFOOT, TORQUE ADAPTER (7) TO 125-135 in-lb (144-155 cmkg).



32. CONNECT HOSE ASSEMBLY (2) TO HYDRAULIC ACCUMULATOR (9).

33. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (10) TO 125-135 in-lb (144-155 cmkg).

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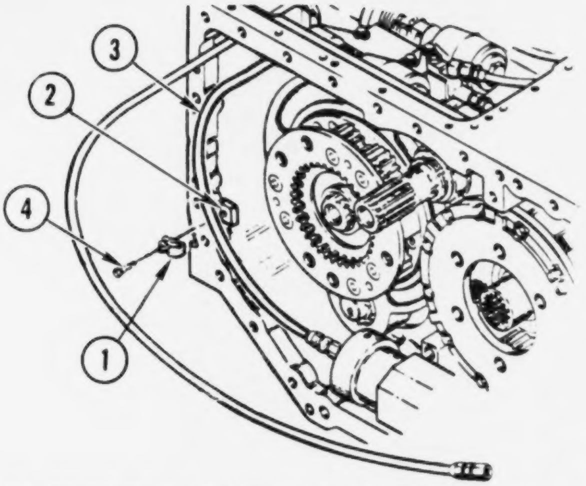
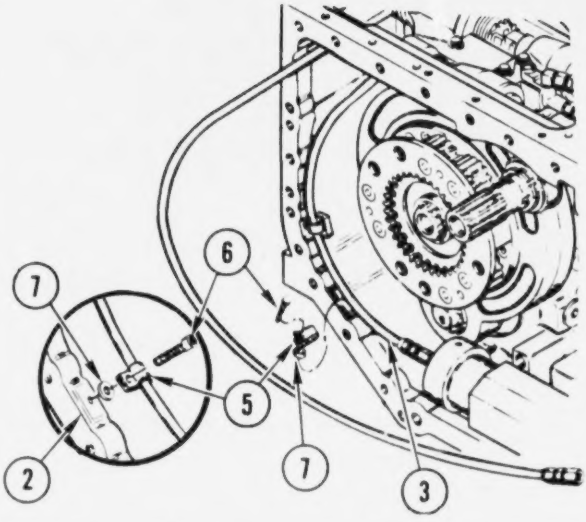


34. SECURE CLAMP (1) ON HOUSING (2).

   a. Position clamp (1), on hose assembly (3).

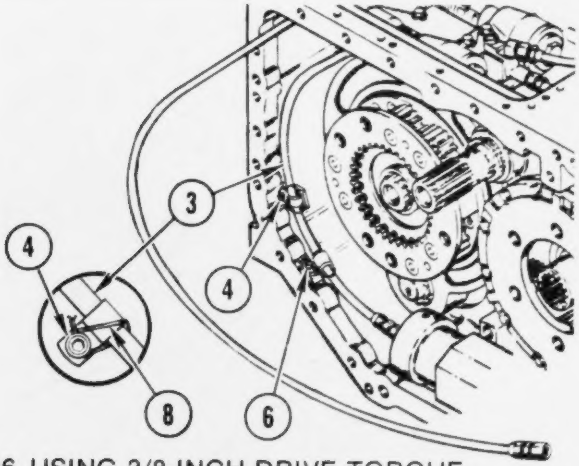
   b. Position clamp (1) against housing (2). Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new short screw (4) through clamp and housing.



35. SECURE CLAMP (5) ON HOUSING (2).

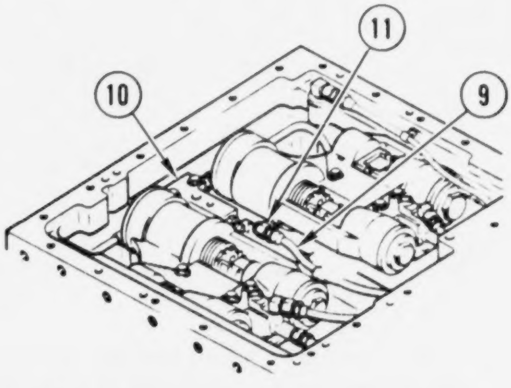
   a. Install clamp (5) on hose assembly (3).

   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new long bolt (6) through clamp (5), spacer (7), and housing (2).



36. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE BOLT (6) AND SCREW (4) TO 35-45 in-lb (40-52 cmkg).

37. USING WIRE-TWISTER PLIERS, INSTALL LOCKWIRE (8) THROUGH BOLT (6) AND AROUND HOSE ASSEMBLY (3). REPEAT FOR SCREW (4).



38. CONNECT HOSE ASSEMBLY (9) TO VALVE ASSEMBLY (10).

39. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (11) TO 125-135 in-lb (144-155 cmkg).

40. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
41. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
42. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
43. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
44. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
45. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
46. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF SUBTASK

REPLACE HOSE ASSEMBLY 11629168-5

DESCRIPTION

This subtask covers: Remove (page 4-25). Install (page 4-27).

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
9. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

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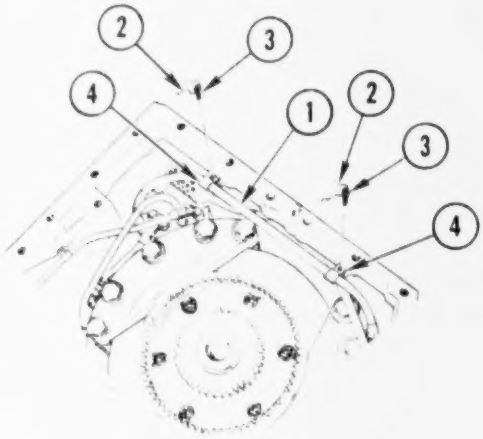
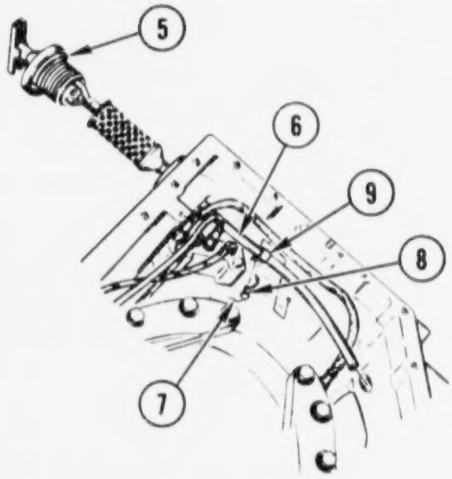
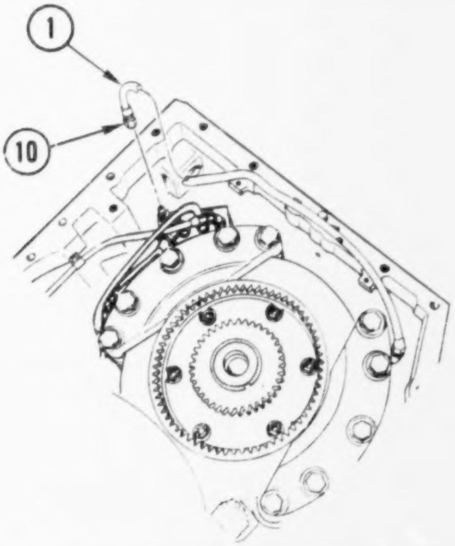


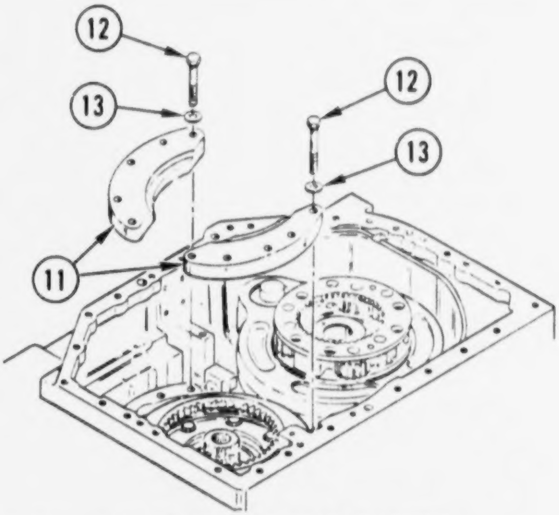
10. RELEASE HOSE ASSEMBLY 11629168-5 (1).
    a. Using wire-twister pliers, remove two lockwires (2). Discard lockwires.
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove two screws (3). Discard screws.
    c. Remove two loop clamps (4).



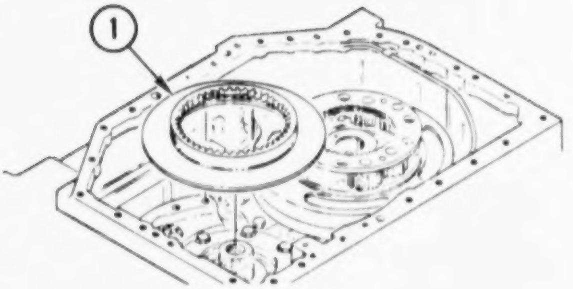
11. REMOVE DIPSTICK (5) AND DIPSTICK TUBE ASSEMBLY (6).
    a. Using wire-twister pliers, remove and discard lockwire (7).
    b. Using 3/8-inch drive ratchet handle and 7/16-inch socket, remove screw (8).
    c. Remove dipstick (5) and dipstick tube assembly (6) with clamp (9).



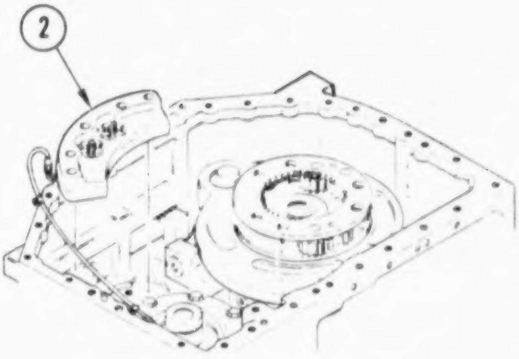
12. DISCONNECT HOSE ASSEMBLY (1).
    a. Using 3/8-inch drive ratchet handle and 9/16-inch crowfoot, disconnect hose nut (10).



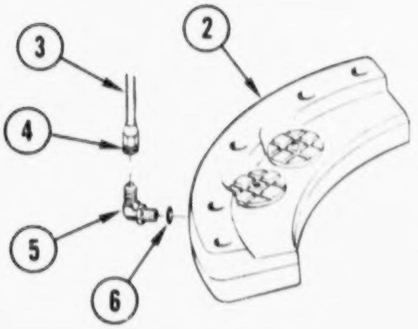
13. REMOVE TWO SECOND RANGE BRAKE ASSEMBLIES (11).
    a. Remove 10 self-locking bolts (12) and washers (13).
    b. Remove two brake assemblies (11).



14. REMOVE RING GEAR (1).



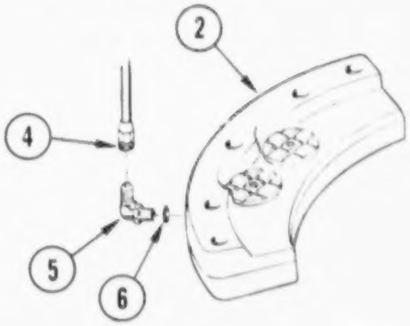
15. REMOVE SECOND RANGE SINGLE DISK BRAKE (2).



16. DISCONNECT HOSE ASSEMBLY (3).
    a. Disconnect hose nut (4) from hose to boss elbow (5).

17. REMOVE ELBOW (5).
    a. Remove elbow (5) and preformed packing (6) from single disk brake (2). Discard packing.

INSTALL



18. INSTALL ELBOW (5).
    a. Coat new preformed packing (6) with transmission oil. Install packing on elbow (5).
    b. Screw elbow (5) into single disk brake (2). Hand tighten until captive washer makes firm contact with single disk brake.
    c. Unscrew elbow (5) to position needed for connection to hose nut (4).

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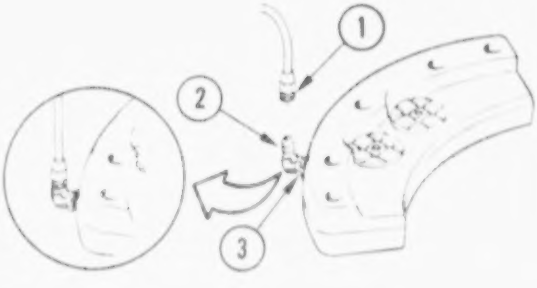
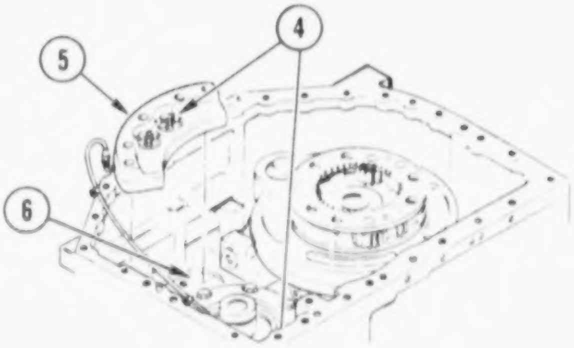


19. CONNECT HOSE NUT (1) TO ELBOW (2).

20. HOLD ELBOW (2). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (3) 125-135 in-lb (144-155 cmkg).

21. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (1) TO 125-135 in-lb (144-155 cmkg).

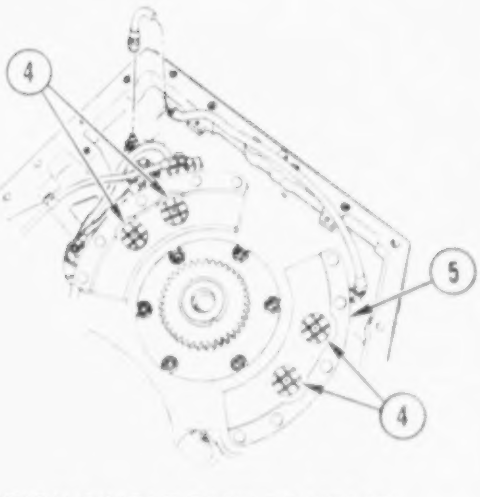


WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

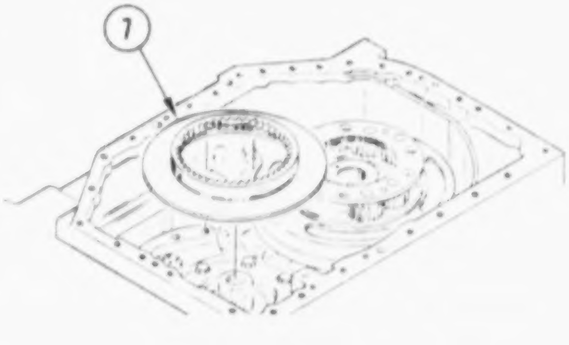
22. CLEAN BRAKE PADS (4) AND MATING SURFACE OF SINGLE DISK BRAKE (5) AND TRANSMISSION HOUSING (6).

    a. Use wiping rag dampened with cleaning solvent.

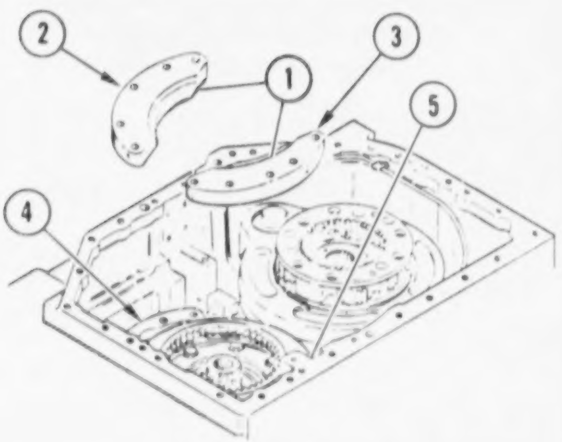


23. POSITION SINGLE DISK BRAKE (5).

    a. Coat brake pads (4) with transmission oil.



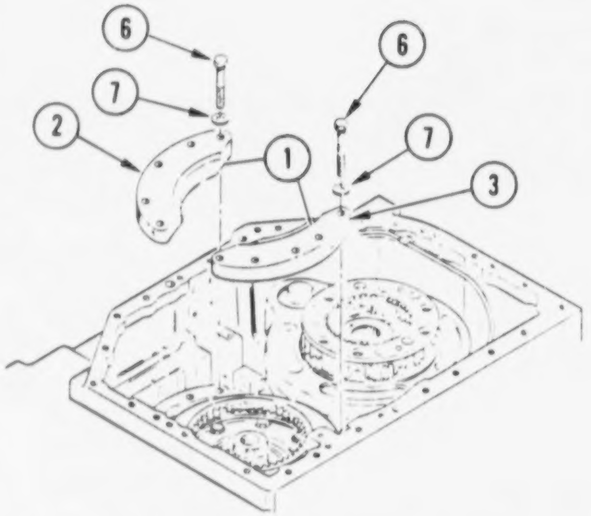
24. INSTALL RING GEAR (7).



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

25. CLEAN BRAKE PADS (1) AND MATING SURFACES OF SECOND RANGE BRAKE ASSEMBLIES (2) AND (3) AND SINGLE DISK BRAKES (4) AND (5).
    a. Use wiping rag dampened with cleaning solvent.



26. INSTALL BRAKE ASSEMBLIES (2) AND (3).
    a. Coat brake pads (1) with transmission oil.
    b. Coat threads of 10 self-locking bolts (6) with sealant compound.
    c. Install 10 washers (7) and bolts (6).

27. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 10 BOLTS (6) TO 150-160 ft-lb (21-22 mkg).

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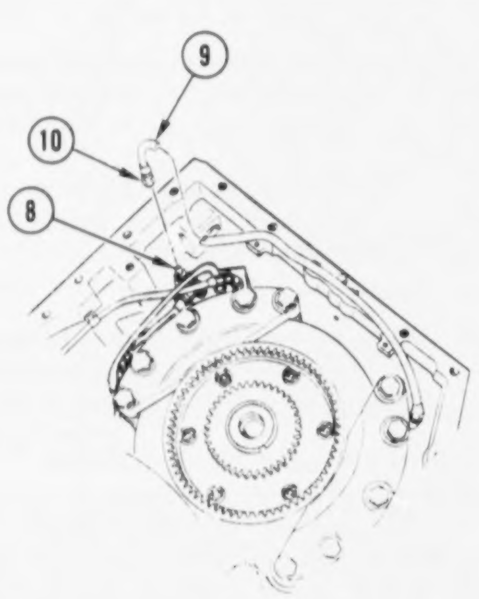
28. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (8) TO TO 125-135 in-lb (144-155 cmkg).

29. INSTALL HOSE ASSEMBLY (9).
    a. Connect hose nut (10) to adapter (8).

30. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (10) TO 125-135 in-lb (144-155 cmkg).



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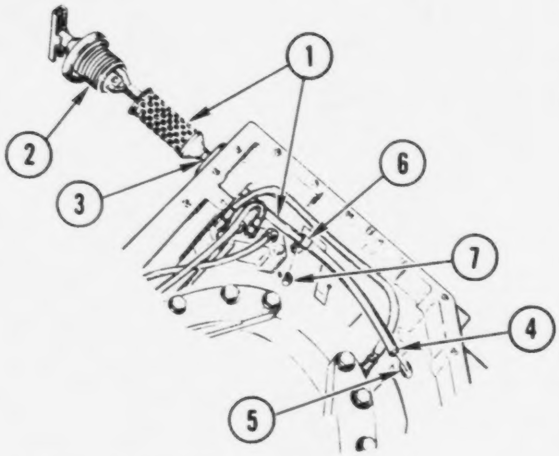
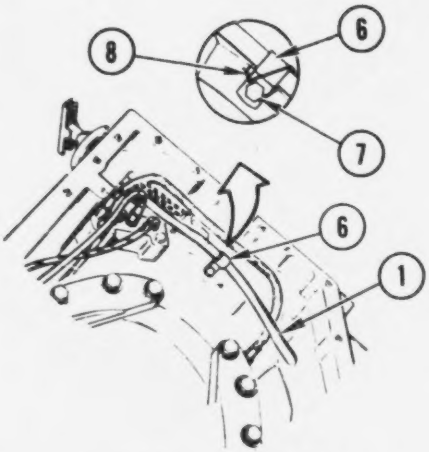


31. INSTALL DIPSTICK TUBE ASSEMBLY (1) AND DIPSTICK (2).

    a. Feed dipstick tube assembly (1) through hole (3). Place lower end (4) of dipstick tube in hole (5).

    b. Install dipstick (2).

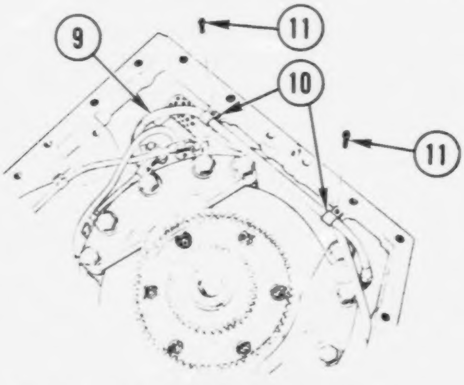
    c. Position flat side of clamp (6) away from main housing and install screw (7).



32. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE SCREW (7) TO 110-120 in-ib (127-138 cmkg).

33. INSTALL LOCKWIRE (8).

    a. Using wire-twister pliers, install lockwire (8) through screw (7) and around dipstick tube assembly (1) and clamp (6).

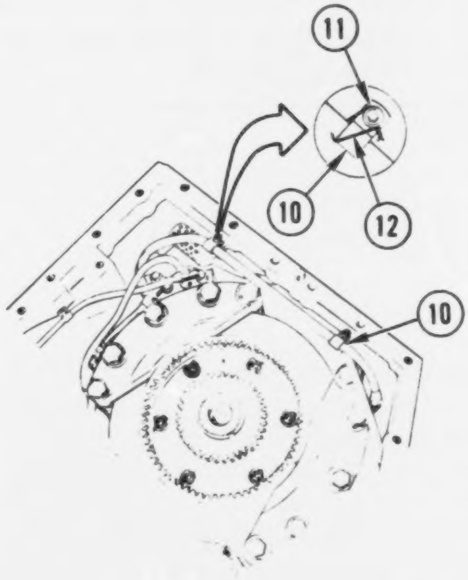


34. SECURE HOSE ASSEMBLY (9).

    a. Position two clamps (10).

    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install two new screws (11).

35. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (11) TO 35-45 in-lb (40-52 cmkg).



36. USING WIRE-TWISTER PLIERS, INSTALL TWO NEW LOCKWIRES (12) IN SCREWS (11) AND AROUND CLAMPS (10).

37. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.
38. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
39. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
40. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
41. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
42. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
43. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
44. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
45. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF SUBTASK

REPLACE HOSE ASSEMBLY 11627588-11

DESCRIPTION

This subtask covers: Remove (page 4-31). Install (page 4-33).

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
3. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
4. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.
5. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
6. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
7. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
8. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

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9. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

10. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

11. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page4-398.

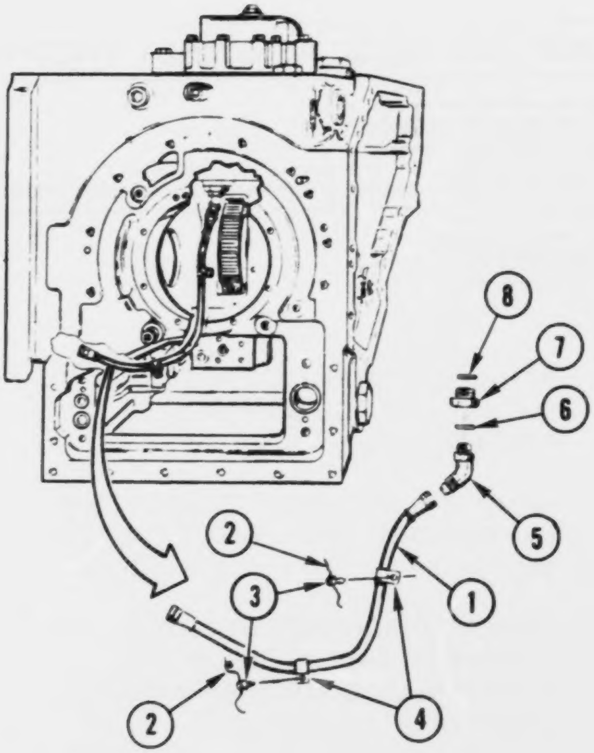
12. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

13. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

14. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

15. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

16. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.



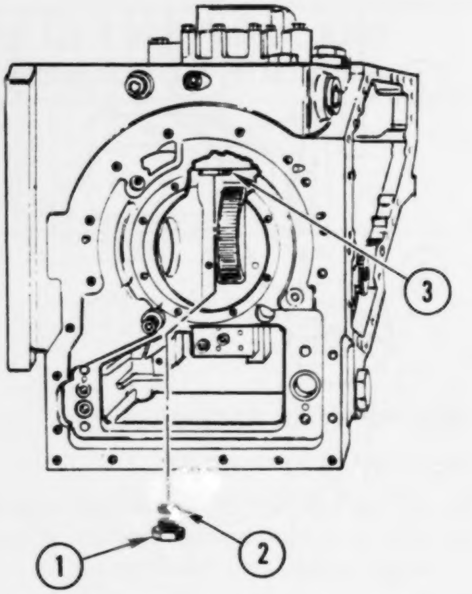
17. RELEASE HOSE ASSEMBLY 11627588-11 (1).
    a. Using wire-twister pliers, remove two lockwires (2). Discard lockwires.
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove two screws (3). Discard screws.
    c. Remove two loop clamps (4).

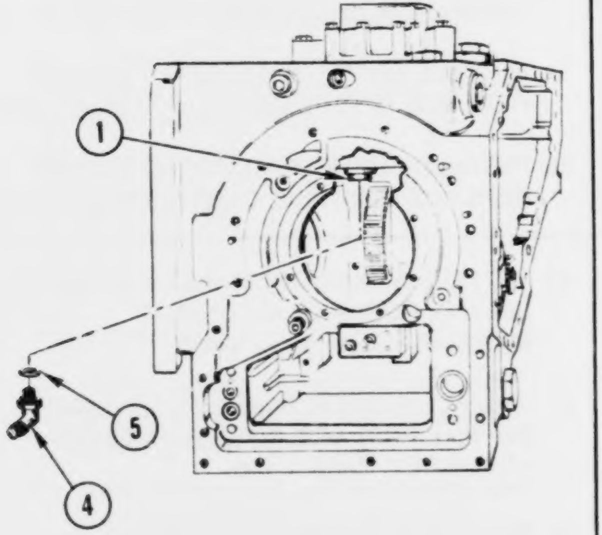
18. DISCONNECT AND REMOVE HOSE ASSEMBLY (1).

19. REMOVE HOSE TO BOSS ELBOW (5), PREFORMED PACKING (6), ADAPTER (7), AND PREFORMED PACKING (8). DISCARD PACKINGS.

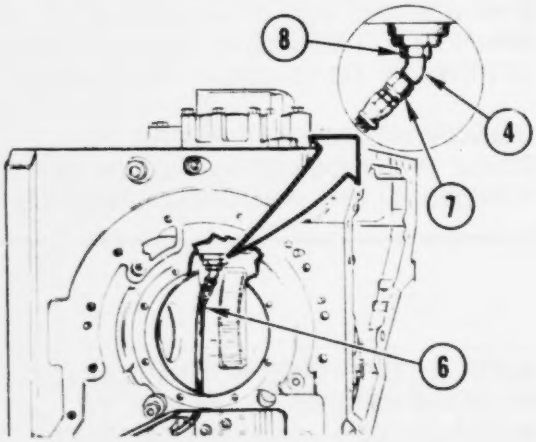
INSTALL

20. INSTALL ADAPTER (1).
    a. Coat new preformed packing (2) with transmission oil. Install on adapter (1).
    b. Screw adapter (1) into housing (3).
21. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE ADAPTER (1) TO 65-75 ft-lb (9-10 mkg).





22. INSTALL ELBOW (4).
    a. Coat new preformed packing (5) with transmission oil. Install on elbow (4).
    b. Screw elbow (4) into adapter (1). Hand tighten until captive washer makes firm contact with adapter.
    c. Unscrew elbow (4) to position needed for connection to hose assembly.



23. INSTALL HOSE ASSEMBLY (6).
    a. Connect hose nut (7) to elbow (4).
24. HOLD ELBOW. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 11/16-INCH CROWFOOT, TORQUE LOCKNUT (8) TO 20-25 ft-lb (3 mkg).
25. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 11/16-INCH CROWFOOT, TORQUE HOSE NUT (7) TO 20-25 ft-lb (3 mkg).

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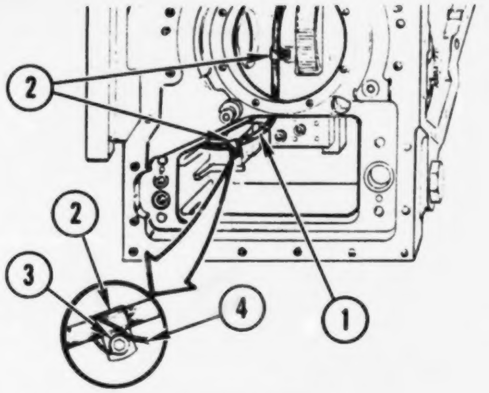


26. SECURE HOSE ASSEMBLY (1).
    a. Install two clamps (2).
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install two new screws (3).

27. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (3) TO 35-45 in-lb (40-52 cmkg).

28. USING WIRE-TWISTER PLIERS, INSTALL TWO NEW LOCKWIRES (4) IN SCREWS (3) AND AROUND CLAMPS (2).

29. INSTALL INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

30. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

31. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

32. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

33. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

34. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

35. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

36. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

37. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

38. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

39. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

40. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

41. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

42. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

43. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

44. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

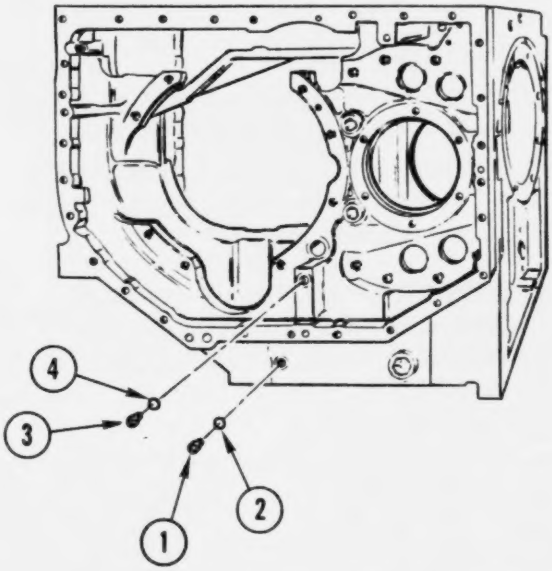
END OF SUBTASK

REPLACE PLUGS 11627748-23, 11627748-25, (2) 11627748-27, AND 11627748-29 ON LEFT-HAND SIDE OF TRANSMISSION HOUSING

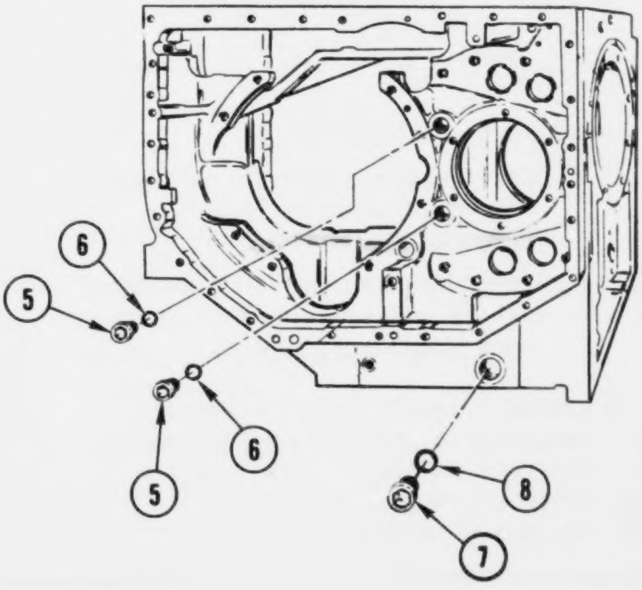
DESCRIPTION

This subtask covers: Remove (page 4-35). Install (page 4-36).

REMOVE



1. REMOVE PLUG 11627748-23 (1).
   - a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove plug (1).
   - b. Remove and discard preformed packing (2).
2. REMOVE PLUG 11627748-25 (3).
   - a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (3).
   - b. Remove and discard preformed packing (4).



3. REMOVE TWO PLUGS 11627748-27 (5).
   - a. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, remove two plugs (5).
   - b. Remove and discard two preformed packings (6).

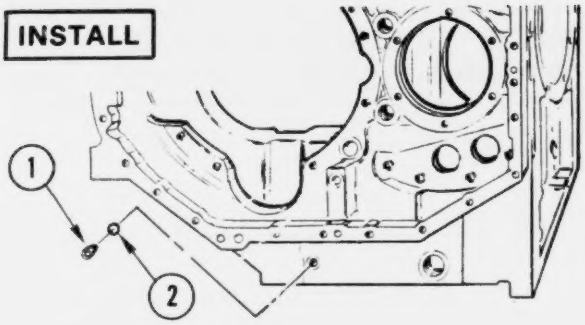
NOTE

Plug 11627748-29 is contained in early model transmission housings only. Later models have no plug.

4. REMOVE PLUG 11627748-29 (7), IF PRESENT.
   - a. Using 5/8-inch socket wrench attachment, remove plug (7).
   - b. Remove and discard preformed packing (8).

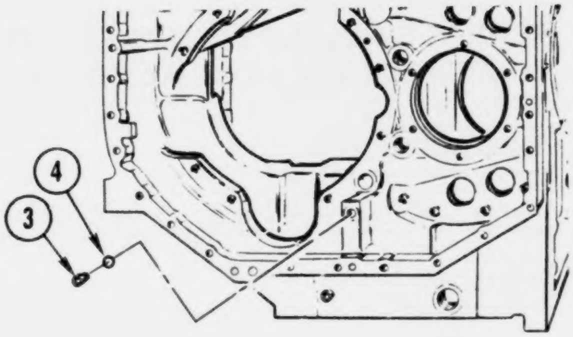
GO TO NEXT PAGE

INSTALL



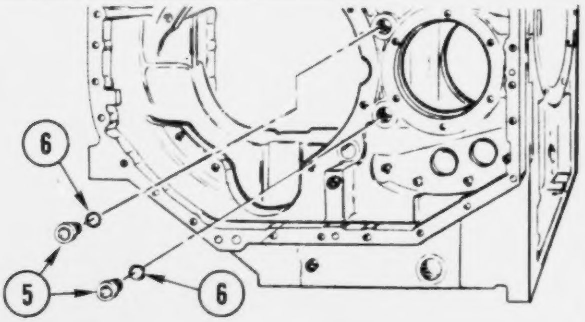
5. INSTALL PLUG (1).
   - a. Coat new preformed packing (2) with transmission oil. Install on plug (1).
   - b. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install plug (1).

6. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 110-120 in-lb (127-138 cmkg).



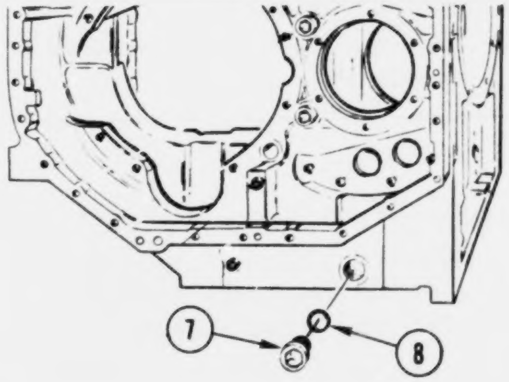
7. INSTALL PLUG (3).
   - a. Coat new preformed packing (4) with transmission oil. Install on plug (3).
   - b. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (3).

8. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 20-25 ft-lb (3 mkg).



9. INSTALL TWO PLUGS (5).
   - a. Coat two new preformed packings (6) with transmission oil. Install on plugs (5).
   - b. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, install two plugs (5).

10. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 3/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (5) TO 30-35 ft-lb (4-5 mkg).



11. INSTALL PLUG (7), IF REMOVED.
    - a. Coat new preformed packing (8) with transmission oil. Install on plug (7).
    - b. Using 5/8-inch socket wrench attachment, install plug (7).

12. USING 1/2-INCH DRIVE TORQUE WRENCH AND 5/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (7) TO 100-110 ft-lb (14-15 mkg).

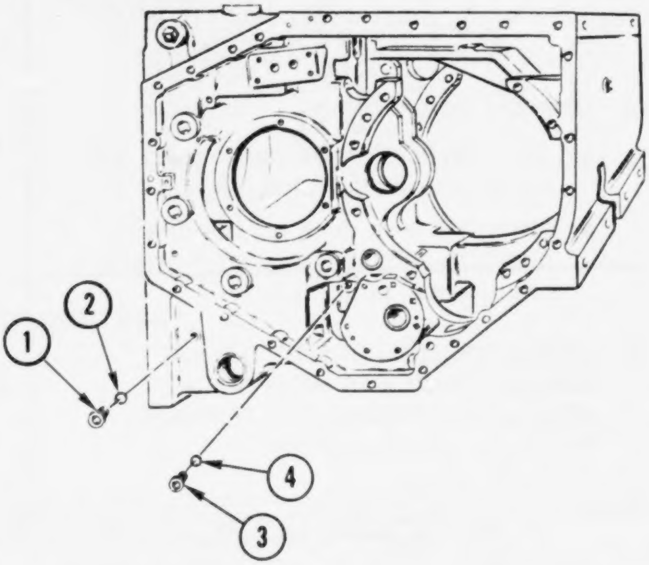
END OF SUBTASK

REPLACE PLUGS 11627748-21, 11627748-23, (3) 11627748-27, 11627748-28, AND 11627748-29 ON RIGHT-HAND SIDE OF TRANSMISSION HOUSING

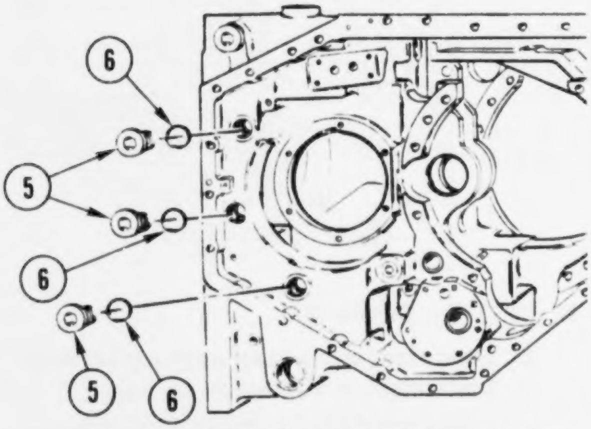
DESCRIPTION

This subtask covers: Remove (page 4-37). Install (page 4-38).

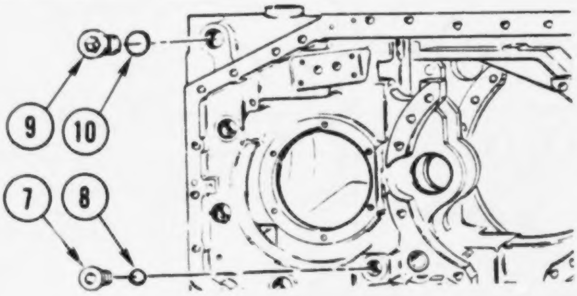
REMOVE



1. REMOVE PLUG 11627748-23 (1).
   a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove plug (1).
   b. Remove and discard preformed packing (2).
2. REMOVE PLUG 11627748-21 (3).
   a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove plug (3).
   b. Remove and discard preformed packing (4).



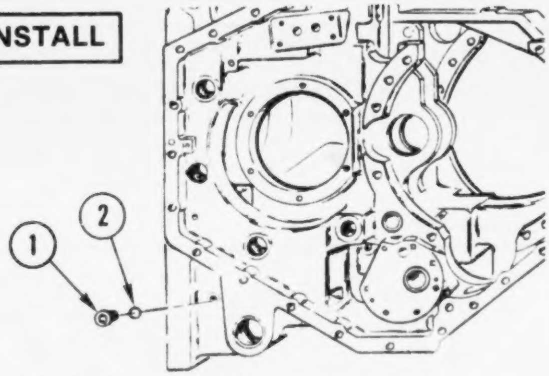
3. REMOVE THREE PLUGS 11627748-27 (5).
   a. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, remove three plugs (5).
   b. Remove and discard three preformed packings (6).



4. REMOVE PLUG 11627748-28 (7).
   a. Using 9/16-inch socket wrench attachment, remove plug (7).
   b. Remove and discard preformed packing (8).
5. REMOVE PLUG 11627748-29 (9).
   a. Using 5/8-inch socket wrench attachment, remove plug (9).
   b. Remove and discard preformed packing (10).

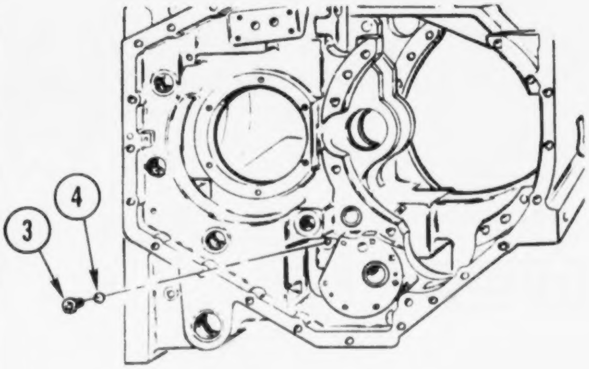
GO TO NEXT PAGE

INSTALL



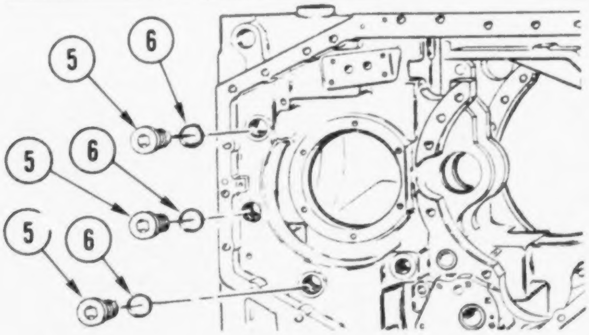
6. INSTALL PLUG (1).
   - a. Coat new preformed packing (2) with transmission oil. Install on plug (1).
   - b. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install plug (1).

7. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 110-120 in-lb (127-138 cmkg).



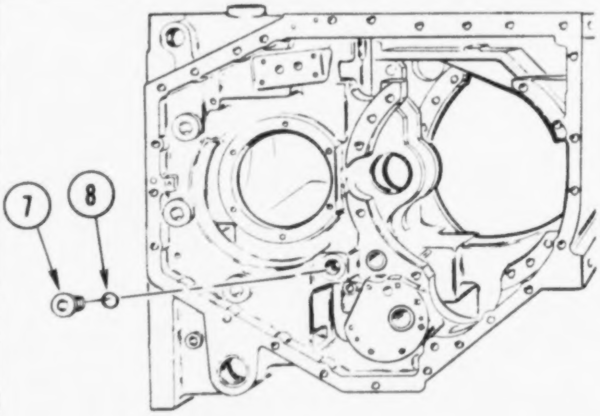
8. INSTALL PLUG (3).
   - a. Coat new preformed packing (4) with transmission oil. Install on plug (3).
   - b. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, install plug (3).

9. USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 50-60 in-lb (58-69 cmkg).



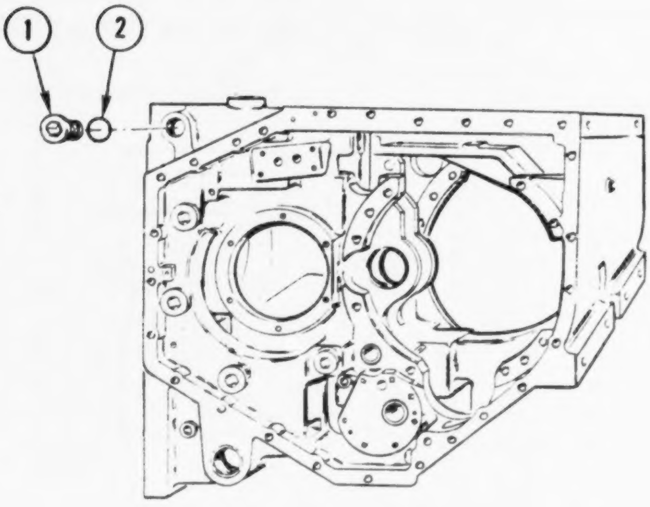
10. INSTALL THREE PLUGS (5).
    - a. Coat three new preformed packings (6) with transmission oil. Install on three plugs (5).
    - b. Using 3/8-inch socket wrench attachment, install three plugs (5).

11. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 3/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE THREE PLUGS (5) TO 30-35 ft-lb (4-5 mkg).



12. INSTALL PLUG (7).
    - a. Coat new preformed packing (8) with transmission oil. Install on plug (7).
    - b. Using 9/16-inch socket wrench attachment, install plug (7).

13. USING 1/2-INCH DRIVE TORQUE WRENCH AND 9/16-INCH SOCKET WRENCH ATTACHMENT , TORQUE PLUG (7) TO 65-75 ft-lb (9-10 mkg).



14. INSTALL PLUG (1).
    a. Coat new preformed packing (2) with transmission oil. Install on plug (1).
    b. Using 5/8-inch socket wrench attachment, install plug (1).
15. USING 1/2-INCH DRIVE TORQUE WRENCH AND 5/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 100-110 ft-lb (14-15 mkg).

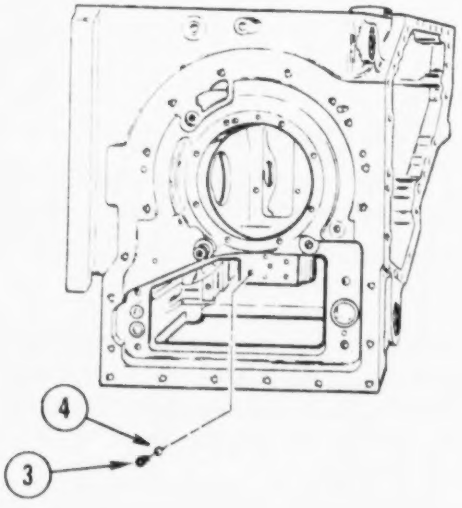
END OF SUBTASK

REPLACE PLUGS 11627748-21 AND 11627748-28 ON INSIDE OF TRANSMISSION HOUSING

DESCRIPTION

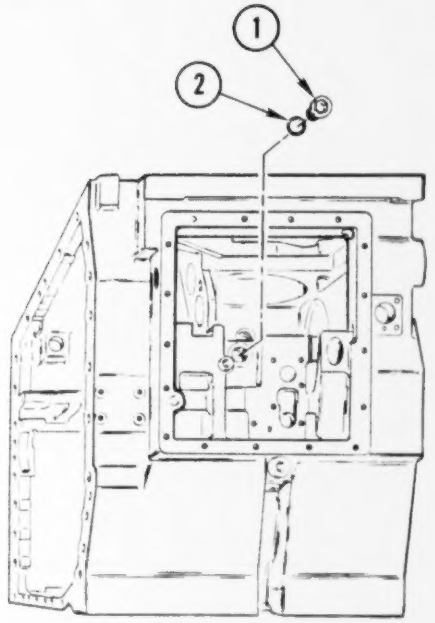
This subtask covers: Remove (page 4-39). Install (page 4-40).

REMOVE



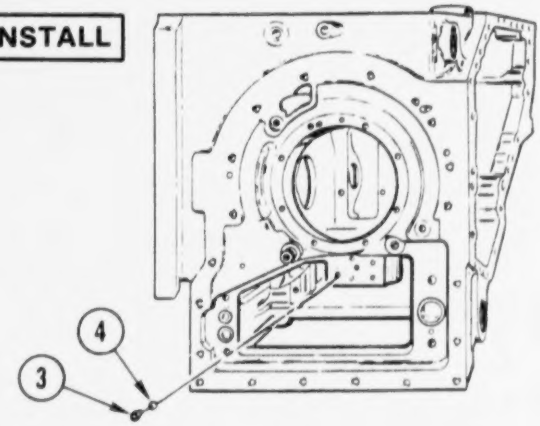
1. REMOVE PLUG 11627748-21 (3).
    a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove plug (3).
    b. Remove and discard preformed packing (4).

GO TO NEXT PAGE



2. REMOVE PLUG 11627748-28 (1).
   a. Using 9/16-inch socket wrench attachment, remove plug (1).
   b. Remove and discard preformed packing (2).

INSTALL

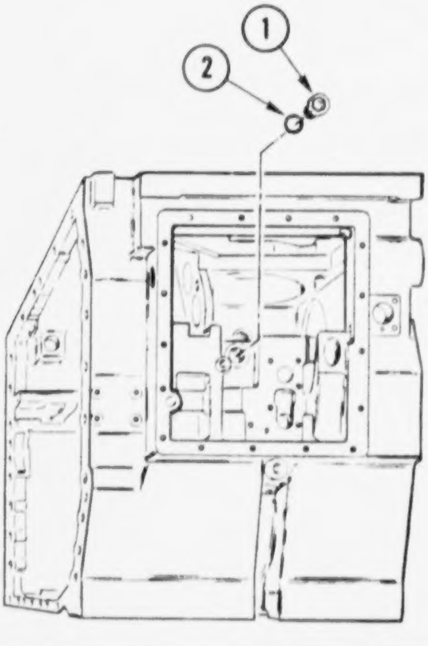


3. INSTALL PLUG (3).
   a. Coat new preformed packing (4) with transmission oil. Install on plug (3).
   b. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, install plug (3).

4. USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 50-60 in-lb (58-69 cmkg).

5. INSTALL PLUG (1).
   a. Coat new preformed packing (2) with transmission oil. Install on plug (1).
   b. Using 9/16-inch socket wrench attachment, install plug (1).

6. USING 1/2-INCH DRIVE TORQUE WRENCH AND 9/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 65-75 ft-lb (9-10 mkg).



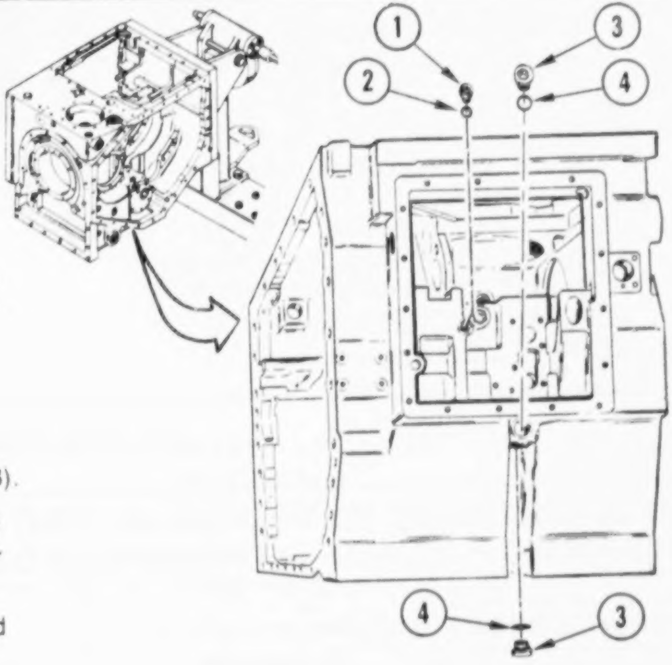
END OF SUBTASK

REPLACE PLUGS 11627748-25 AND 11627748-27 ON BOTTOM OF TRANSMISSION

DESCRIPTION

This subtask covers: Remove (page 4-41). Install (page 4-41).

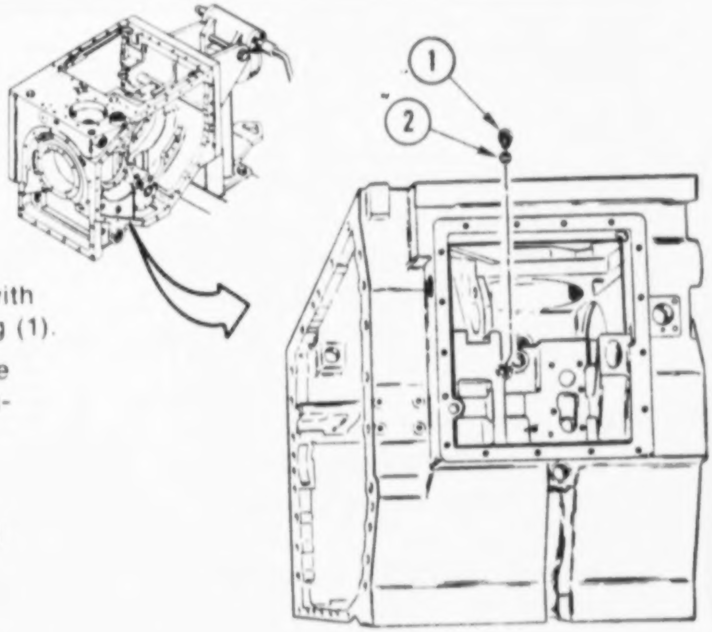
REMOVE



1. REMOVE PLUG 11627748-25 (1).
   a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (1).
   b. Remove and discard preformed packing (2).

2. REMOVE TWO PLUGS 11627748-27 (3).
   a. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, remove two plugs (3).
   b. Remove and discard two preformed packings (4).

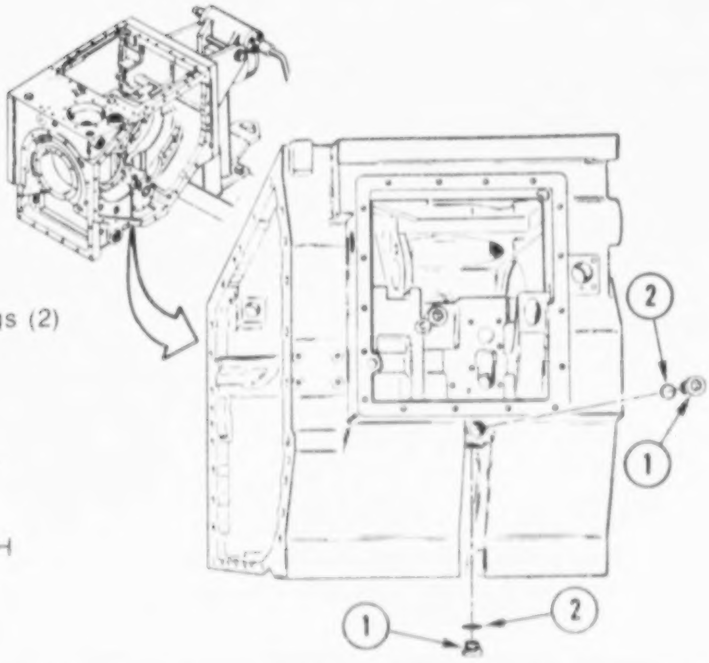
INSTALL



3. INSTALL PLUG (1).
   a. Coat new preformed packing (2) with transmission oil and install on plug (1).
   b. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (1).

4. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 16-20 ft-lb (2-3 mkg).

GO TO NEXT PAGE



5. INSTALL TWO PLUGS (1).
   a. Coat two new preformed packings (2) with transmission oil. Install on plugs (1).
   b. Using 3/8-inch socket wrench attachment, install two plugs (1).

6. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 3/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (1) TO 30-35 ft-lb (4-5 mkg).

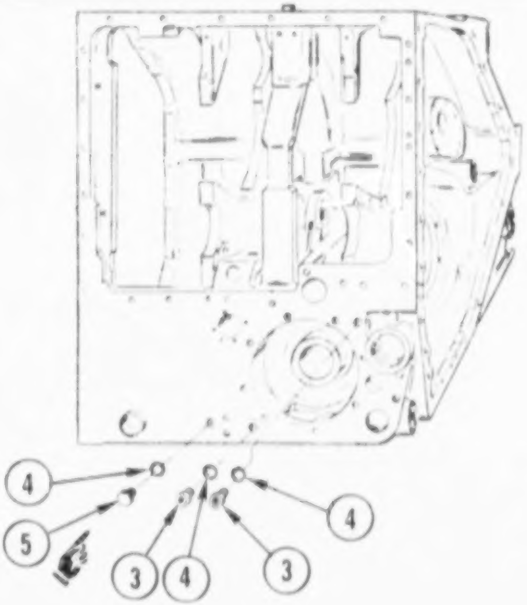
END OF SUBTASK

REPLACE PLUGS (5) 11627748-23, 11627748-25, 11627748-28, AND MS 51840-23 ON TOP OF TRANSMISSION HOUSING

DESCRIPTION

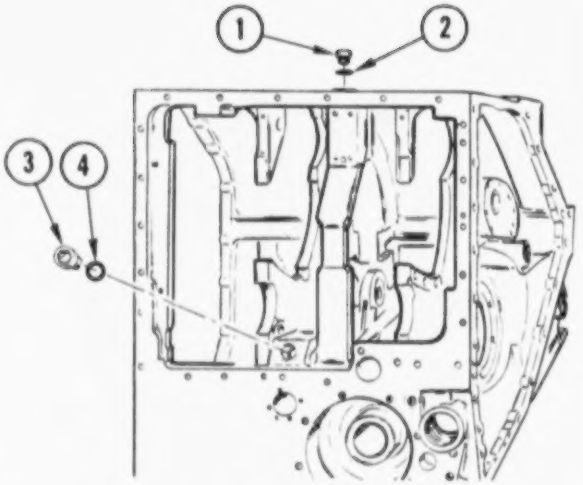
This subtask covers: Remove (page 4-42), Install (page 4-43).

REMOVE



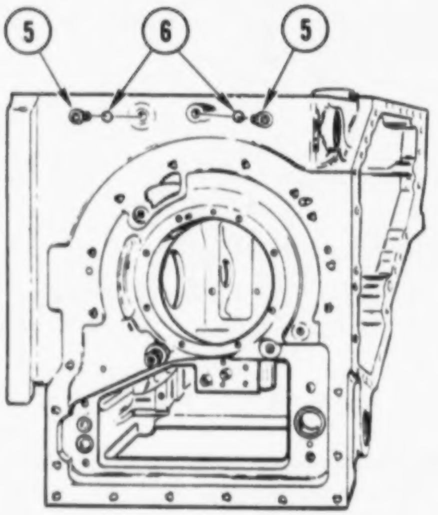
1. REMOVE TWO PLUGS 11627748-23 (3).
   a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove two plugs (3).
   b. Remove and discard two preformed packings (4).

1.1 REMOVE PLUG MS 51840-23 (5).
   a. Using 3/8-inch drive ratchet handle and 9/16-inch socket, remove plug (5).
   b. Remove and discard preformed packing (4).



2. REMOVE PLUG 11627748-25 (1).
   a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (1).
   b. Remove and discard preformed packing (2).

3. REMOVE PLUG 11627748-28 (3).
   a. Using 9/16-inch socket wrench attachment, remove plug (3).
   b. Remove and discard preformed packing (4).

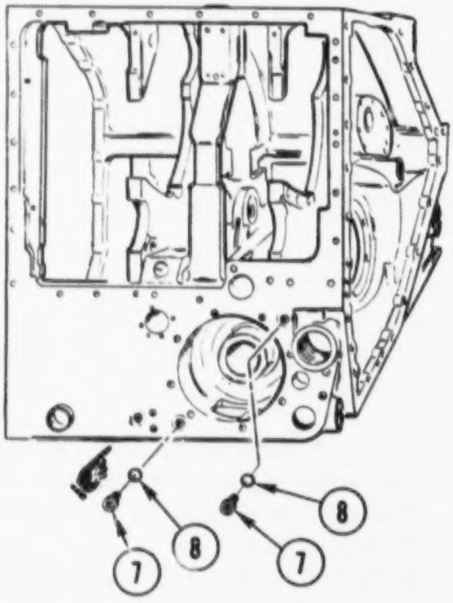


4. REMOVE TWO PLUGS 11627748-23 (5).
   a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove two plugs (5).
   b. Remove and discard two preformed packings (6).

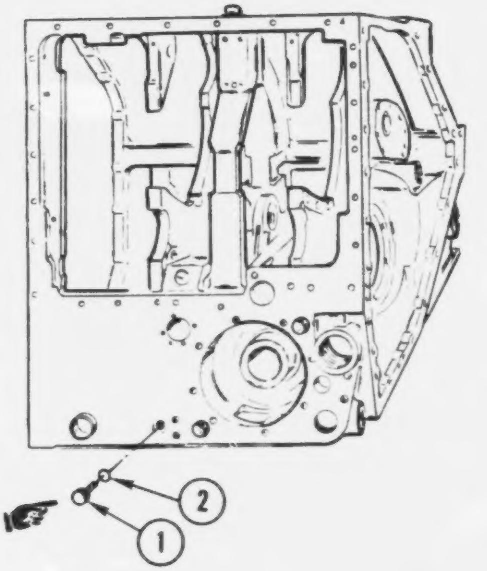
INSTALL

5. INSTALL TWO PLUGS (7).
   a. Coat two new preformed packings (8) with transmission oil. Install on plugs (7).
   b. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install two plugs (7).

6. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (7) TO 110-120 in-lb (127-138 cmkg).



GO TO NEXT PAGE

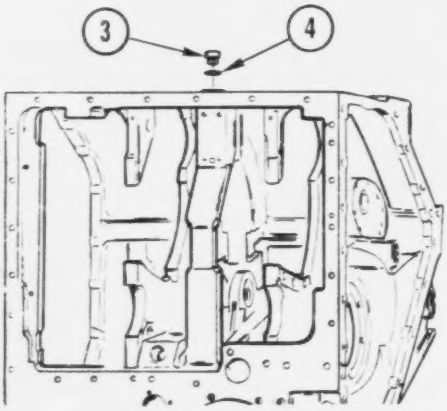


6.1 INSTALL PLUG (1).

a. Coat new preformed packing (2) with transmission oil. Install on plug (1).

b. Using 3/8-inch drive ratchet handle and 9/16-inch socket, install plug (1).

6.2 USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH SOCKET, TORQUE PLUG (1) TO 110-120 in-lbs (127-138 cmkg).

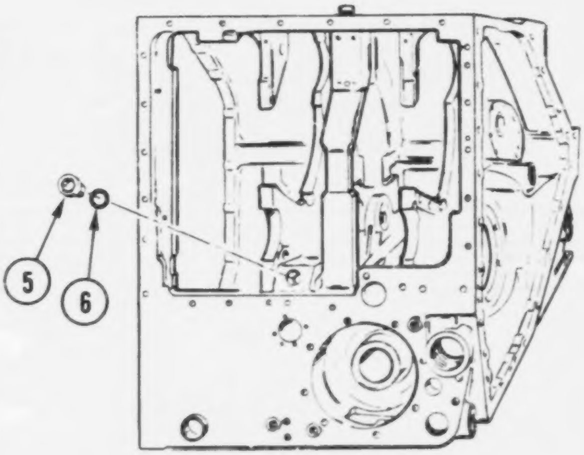


7. INSTALL PLUG (3).

a. Coat new preformed packing (4) with transmission oil. Install on plug (3).

b. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (3).

8. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 16-20 ft-lb (2-3 mkg).



9. INSTALL PLUG (5).

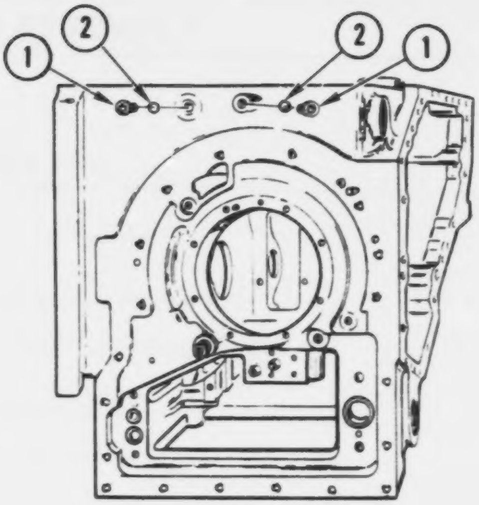
a. Coat new preformed packing (6) with transmission oil. Install on plug (5).

b. Using 9/16-inch socket wrench attachment, install plug (5).

10. USING 1/2-INCH DRIVE TORQUE WRENCH AND 9/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (5) TO 65-75 ft-lb (9-10 mkg).

11. INSTALL TWO PLUGS (1).
    a. Coat two new preformed packings (2) with transmission oil. Install on plugs (1).
    b. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install two plugs (1).

12. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (1) TO 110-120 in-lb (127-138 cmkg).



END OF SUBTASK

END OF TASK

REPLACE INPUT IDLER SPUR GEAR ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-45). Install (page 4-49).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing installer — (Item 14, App C)
Drive pin punch — (Item 25, App C)
Drive pin punch set — (Item 26, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Tapered pin assortment — (Item 92, App C)

Materials/Parts:

Wood block (2) — (Item 2, App D)
Grooved pin

Personnel Required:

Track Veh Rep 63H10

References:

TM 9-214

Equipment Conditions:

Transmission mounted on tip-over stand. See page page 2-144.

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
3. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
4. REMOVE POWER TAKE OFF ASSEMBLY. See task REPLACE POWER TAKE OFF ASSEMBLY, page 4-140.
5. REMOVE AUXILIARY MAKEUP PUMP See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.
6. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
7. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
8. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
9. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
10. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

GO TO NEXT PAGE

11. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

12. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

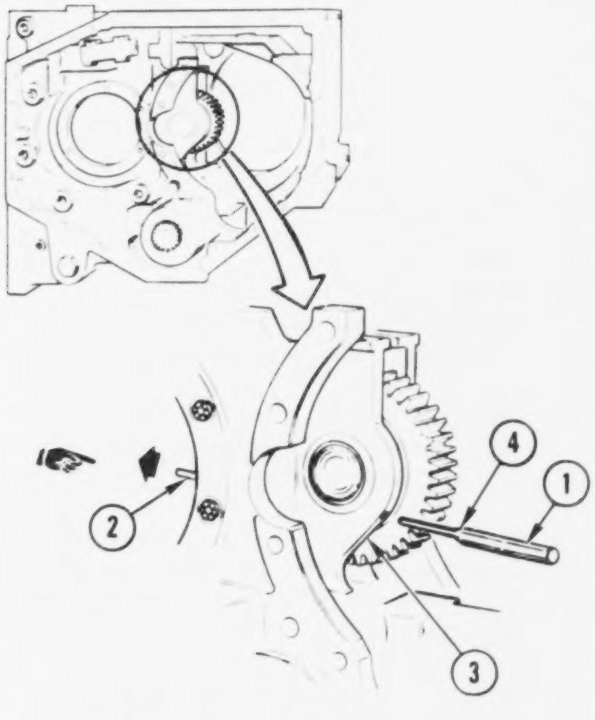
13. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

14. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

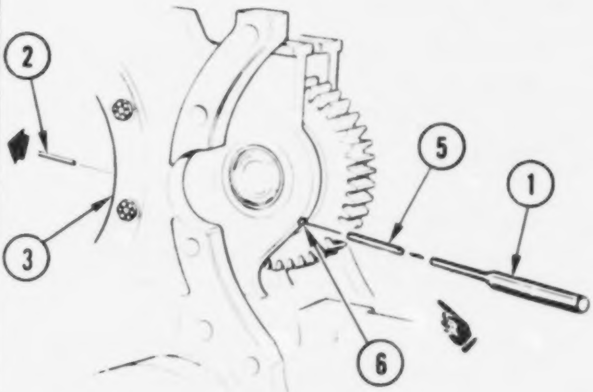
15. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

16. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.

17. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

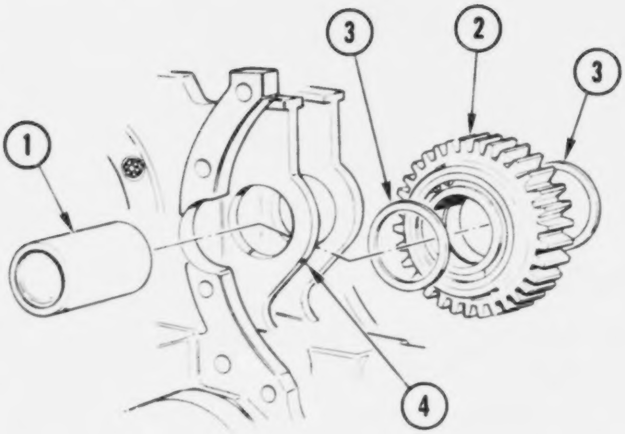


18. USING 1/8-INCH DRIVE PIN PUNCH (1) (ITEM 26), DRIVE GROOVED PIN (2) OUT OF HOUSING (3) UNTIL PUNCH SHOULDER (4) CONTACTS HOUSING. REMOVE PUNCH FROM HOUSING.



18.1. REMOVE GROOVE PIN (2).

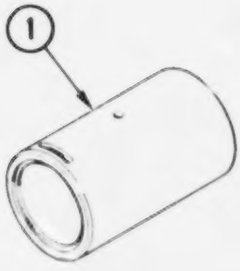
   a. Insert 0.141-inch tapered pin (5) and punch (1) (Item 26) into hole (6) in housing (3).
   b. Drive punch (1) until grooved pin (2) is free of housing (3).
   c. Remove tapered pin (5) and punch (1).
   d. Discard grooved pin (2).



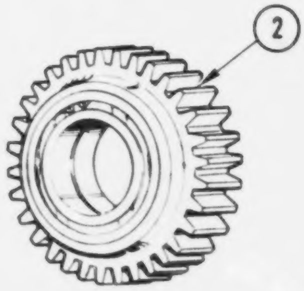
CAUTION

Support spur gear when removing input idler spindle. Damage to equipment can occur.

19. REMOVE INPUT IDLER SPINDLE (1), SPUR GEAR (2), AND TWO THRUST WASHERS (3).
    a. Using plastic-faced hammer, tap spindle (1) out right side of main housing (4).
    b. Remove gear (2) and two thrust washers (3).



20. INSPECT SPINDLE (1).
    a. Inspect spindle (1) for damage. See page 2-5.
    b. Replace spindle (1) if damaged.



21. INSPECT GEAR (2).
    a. Inspect gear (2) for damage. See page 2-5.
    b. If gear (2) is not damaged, go to step 22. If gear is damaged, go to step 23.

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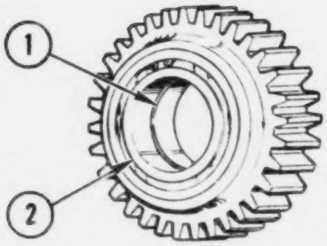
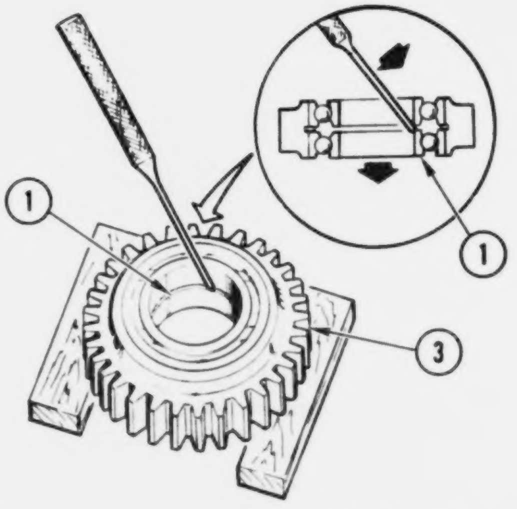


22. INSPECT ROLLER BEARINGS (1) AND (2).

    a. Inspect bearings (1) and (2) for damage. See TM 9-214.

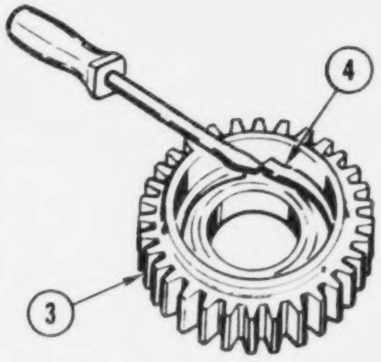
    b. If either bearing (1) or (2) is damaged, go to step 23. If bearings are not damaged, go to step 26.



23. REMOVE AND DISCARD BEARING (1).

    a. Place gear (3) on two wood blocks. Do not place blocks in way of bearing (1).

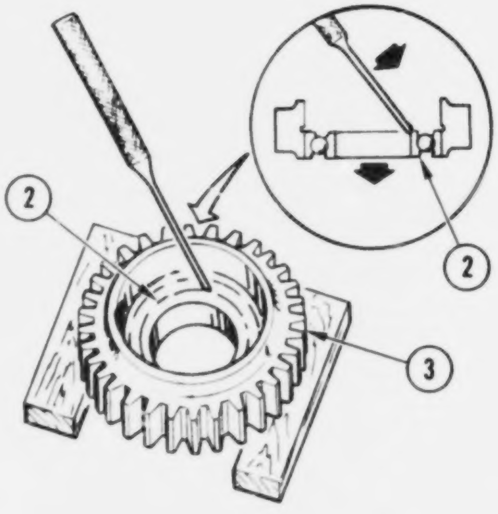
    b. Using 1/8-inch drive pin punch (Item 26) and hammer, remove and discard bearing (1).



24. REMOVE INTERNAL SNAP RING (4).

    a. Turn gear (3) over.

    b. Using screwdriver, pry out internal snap ring (4).

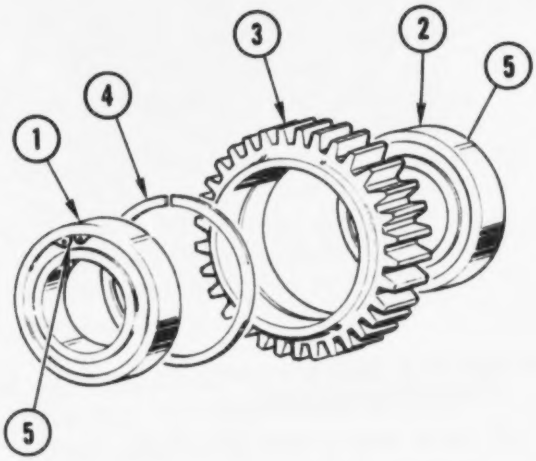


25. REMOVE AND DISCARD BEARING (2).

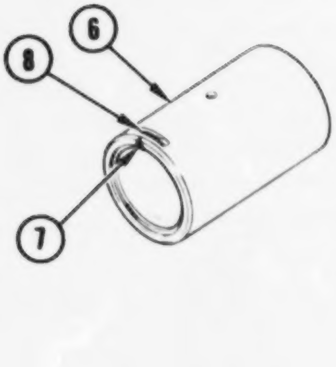
    a. Using 1/8-inch drive pin punch (Item 26) and hammer, remove and discard bearing (2).

    b. Replace gear (3) if damaged.

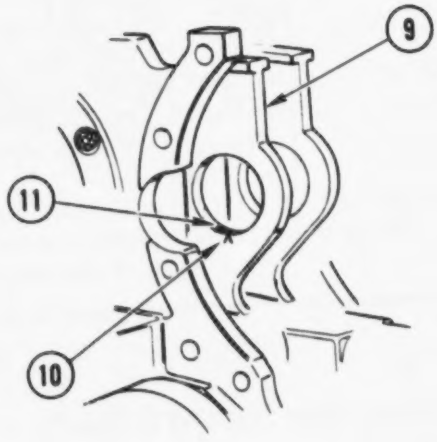
INSTALL



26. INSTALL NEW BEARINGS (1) AND (2).
    - a. If bearings (1) and (2) were removed or gear (3) was replaced, go to step 26b. If two bearings were not removed or gear was not replaced, go to step 27.
    - b. Install internal snap ring (4).
    - c. Using arbor press and bearing installer, install new bearings (1) and (2)with retaining rings (5) facing out.



27. MARK SPINDLE (6) AT POINT (7), WHICH ALINES WITH CENTER OF PIN GROOVE (8).



28. MARK MAIN HOUSING (9) AT POINT (10), WHICH ALINES WITH CENTER OF PIN GROOVE (11).

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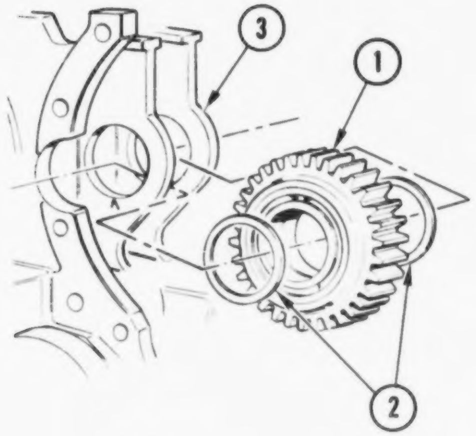
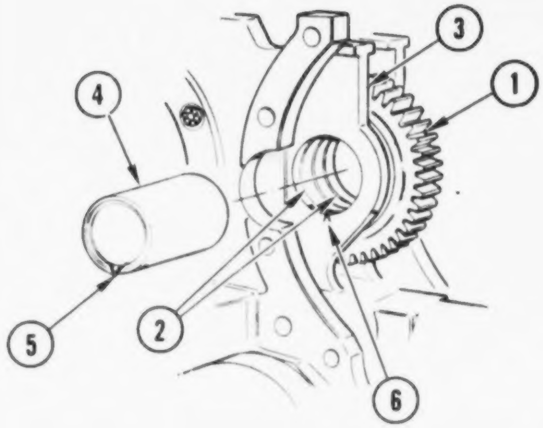


29. INSTALL GEAR (1) AND TWO THRUST WASHERS (2).

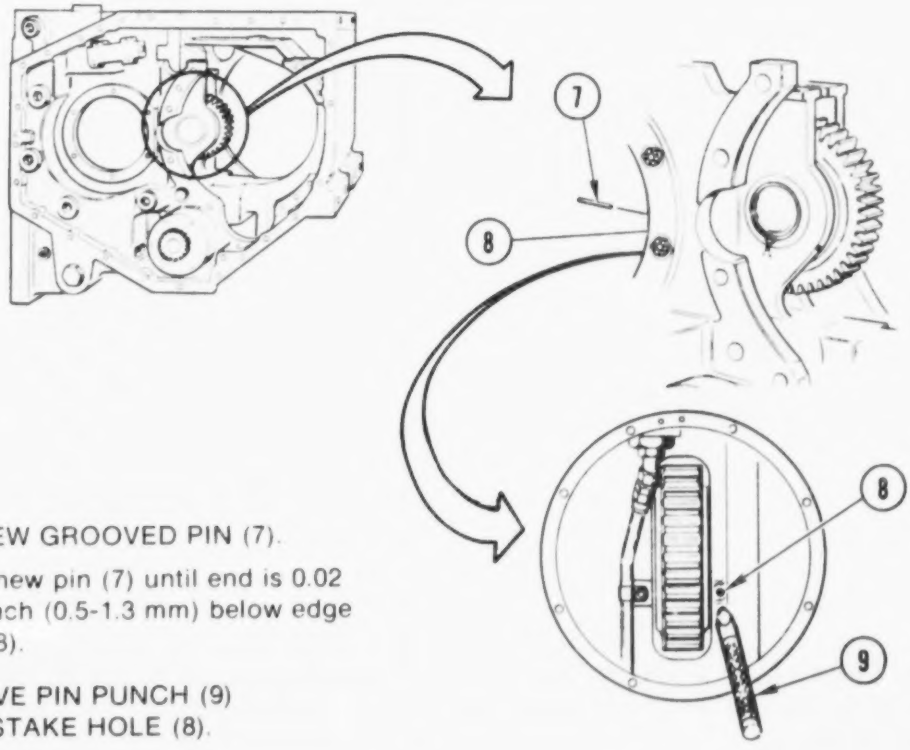
    a. Aline thrust washer (2), gear (1), and second thrust washer (2) with hole in main housing (3).



30. INSTALL SPINDLE (4).

    a. Aline mark (5) on spindle (4) with mark (6) on main housing (3).

    b. Using plastic-faced hammer, tap spindle (4) through main housing (3), two thrust washers (2), and gear (1).



31. INSTALL NEW GROOVED PIN (7).

    a. Drive in new pin (7) until end is 0.02 to 0.05 inch (0.5-1.3 mm) below edge of hole (8).

32. USING DRIVE PIN PUNCH (9) (ITEM 25), STAKE HOLE (8).

33. INSTALL INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

34. INSTALL LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.

35. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

36. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

37. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

38. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

39. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

40. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

41. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

42. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

43. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

44. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

45. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

46. INSTALL POWER TAKE OFF ASSEMBLY. See task REPLACE POWER TAKE OFF ASSEMBLY, page 4-140.

47. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

48. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

49. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPLACE DISCONNECT CLUTCH

DESCRIPTION

This task covers: Remove (page 4-52). Install (page 4-56).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer caliper set — (Item 52, App C)
- Oil seal replacer — (Item 55, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Petrolatum — (Item 7, App B)
- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)
- Wood block (3) — (Item 2, App D)
- Friction clutch repair kit
- Gasket
- Lock washer (12)

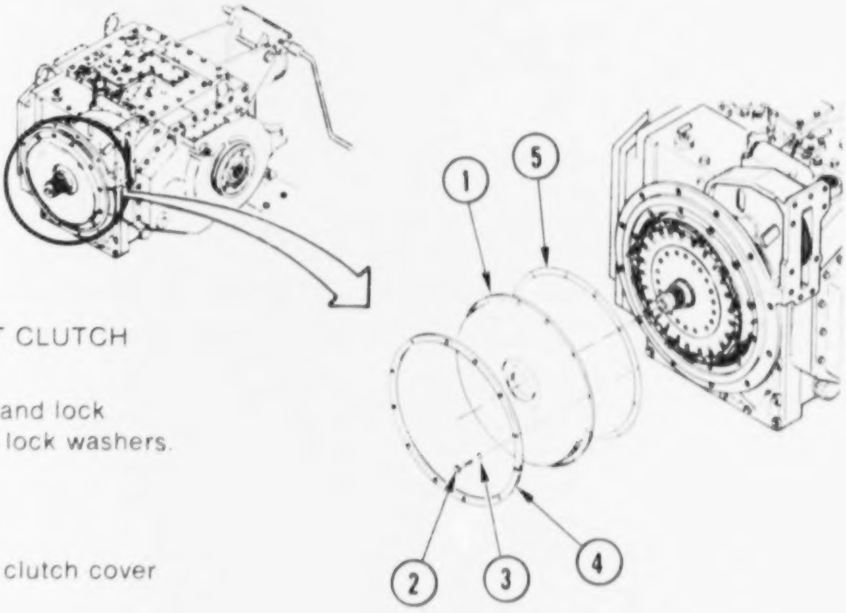
Personnel Required:

Track Veh Rep 63H10

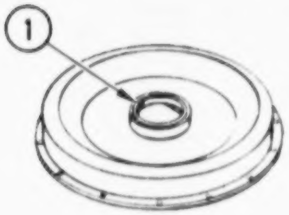
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

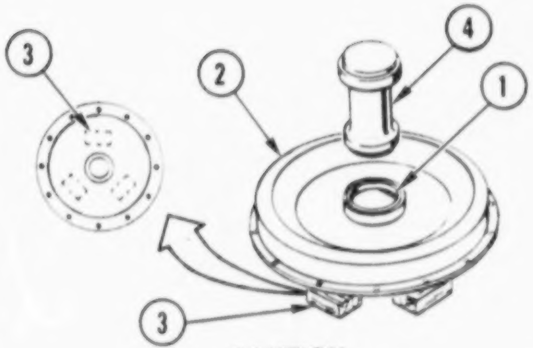
REMOVE



1. REMOVE DISCONNECT CLUTCH COVER (1).
   a. Remove 12 bolts (2) and lock washers (3). Discard lock washers.
   b. Remove ring (4).
   c. Remove cover (1).
   d. Remove and discard clutch cover gasket (5).



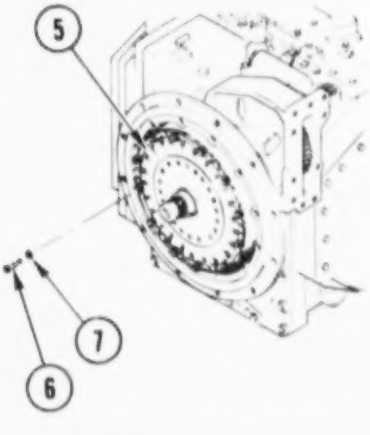
2. INSPECT PLAIN ENCASED SEAL (1).
   a. Inspect seal (1) for damage. See page 2-5.
   b. If seal (1) is damaged, go to step 3. If not, go to step 4.



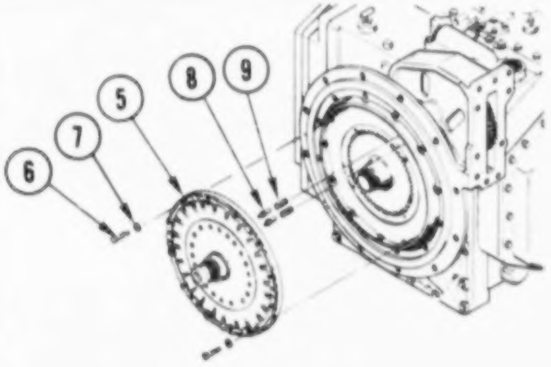
CAUTION

Do not remove encased seal unless cover is properly blocked to prevent bending. Damage to equipment can occur.

3. REMOVE SEAL (1).
   a. Position cover (2) on three 2- by 4- by 6-inch wood blocks (3).
   b. Fit small end of oil seal replacer (4) into seal (1).
   c. Using plastic-faced hammer, tap seal (1) from cover (2) and discard seal.



4. PREPARE BACKUP PLATE ASSEMBLY (5) FOR REMOVAL.
   a. Loosen 12 screws (6) evenly.
   b. Remove 10 screws (6) and washers (7), leaving one screw on top and one screw on the bottom.



NOTE

Backup plate assembly contains small parts which can easily become lost.

5. REMOVE PLATE ASSEMBLY (5).
   a. While holding plate assembly (5), remove last two screws (6) and washers (7).
   b. Remove plate assembly (5). Tip top of plate assembly back when removing to keep spring guide pins (8) and springs (9) from falling out.

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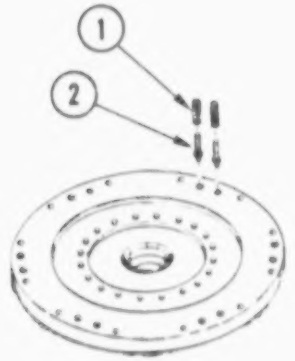
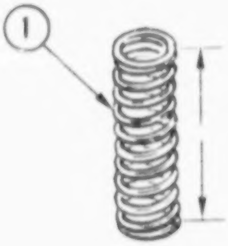
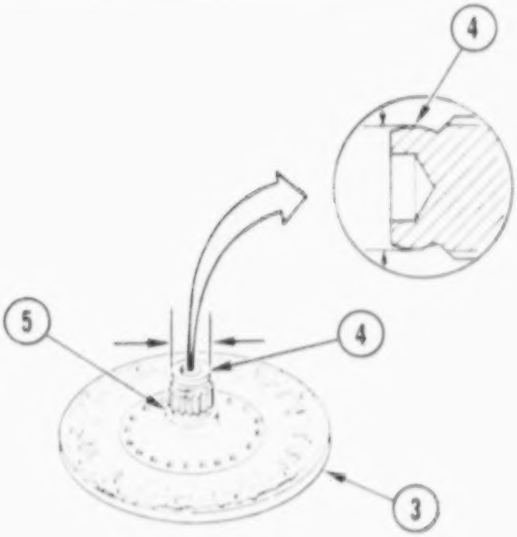


6. REMOVE 12 SPRINGS (1) AND SPRING GUIDE PINS (2).



7. CHECK SPRINGS (1).

   a. Using indicator caliper, measure free length of springs (1). Replace any spring that has a free length of less than 1.328 inches (33.73 mm).

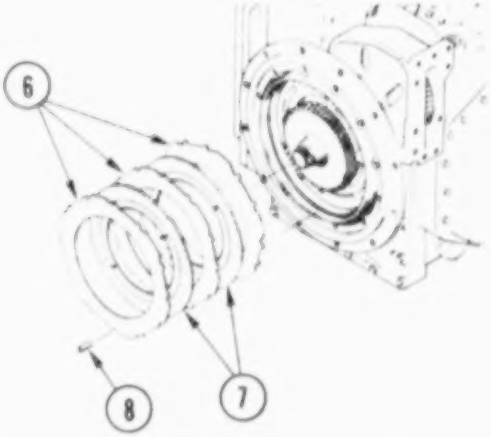


8. TURN PLATE ASSEMBLY (3) OVER.

9. CHECK PLATE ASSEMBLY (3).

   a. Using micrometer caliper set, measure diameter of pilot (4) on hub (5).

   b. Replace plate assembly (3) if measurement is less than 2.245 inches (57.023 mm).

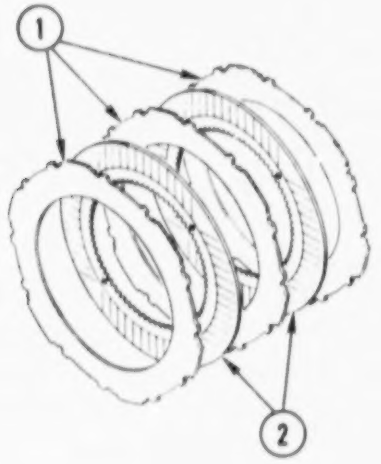


10. REMOVE 3 CLUTCH PLATES (6), 2 FRICTION CLUTCH PLATES (7), AND 12 SPACERS (8).

    a. Remove 1 clutch plate (6) and 12 spacers (8).

    b. Remove one friction clutch plate (7), second clutch plate (6) and second friction clutch plate.

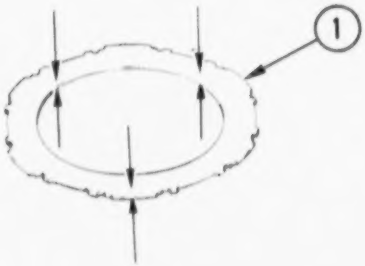
    c. Using plastic-faced hammer, tap last clutch plate (6) to loosen. Remove clutch plate.



11. INSPECT CLUTCH PLATES (1) AND FRICTION CLUTCH PLATES (2).

   a. Inspect clutch plates (1) and friction plates (2). See page 2-5.

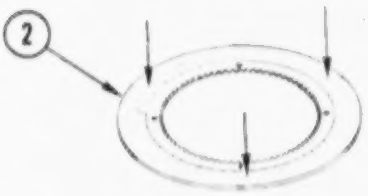
   b. Replace all five plates if any plate is damaged.



12. CHECK THREE CLUTCH PLATES (1).

   a. Using micrometer caliper set, measure thickness of each plate (1) in three places. Replace all five plates if any measurement is less than 0.156 inch (3.96 mm).

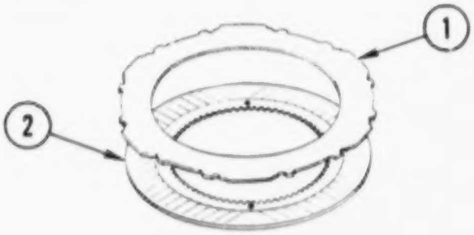
   b. Using flat surface and feeler gage, check plate (1) for warpage. Check inside and outside edges in three places. Replace all five plates if any warpage is greater than 0.010 inch (0.25 mm).



13. CHECK TWO FRICTION CLUTCH PLATES (2).

   a. Using micrometer caliper set, measure thickness of each plate (2) in three places. Replace all five plates if any measurement is less than 0.170 inch (4.32 mm).

   b. Using flat surface and feeler gage, check plate (2) for warpage. Check inside and outside edges in three places. Replace all five plates if any warpage is greater than 0.010 inch (0.25 mm).



14. IF PLATES (1) AND (2) WERE REPLACED, GO TO STEP 15. IF NOT, GO TO STEP 18.

15. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

16. REPAIR DISCONNECT CLUTCH ASSEMBLY, page 4-82.

17. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

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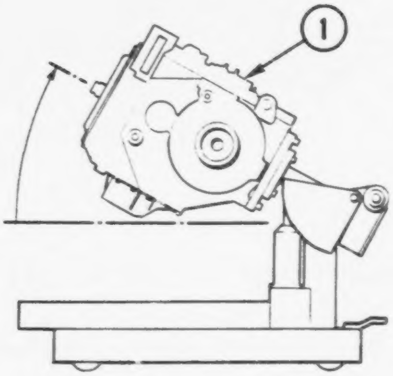
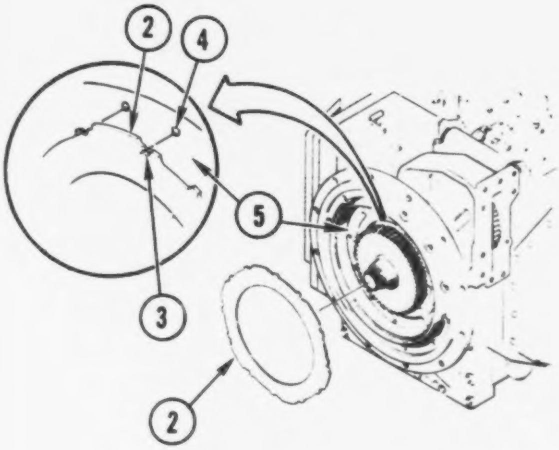
INSTALL



18. POSITION TRANSMISSION (1).

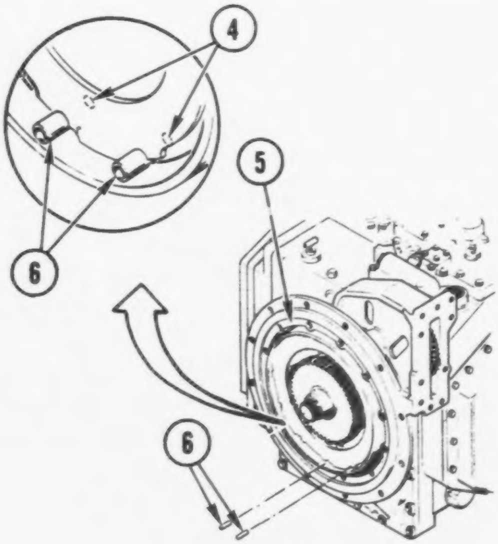
    a. Tiit transmission (1) up slightly.



19. INSTALL FIRST CLUTCH PLATE (2).

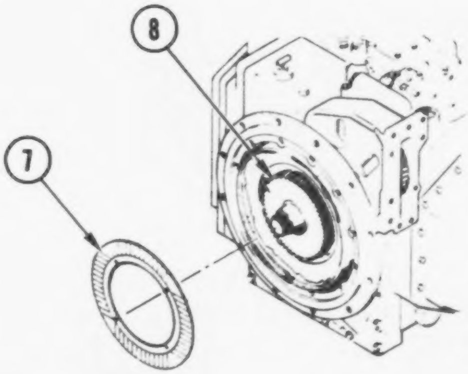
    a. Coat first clutch plate (2) with transmission oil.

    b. Aline notches (3) in clutch plate (2) with screw holes (4) in disconnect clutch assembly (5) Install clutch plate.



20. INSTALL TWO SPACERS (6).

    a. Place two spacers (6) in line with screw holes (4) at bottom of disconnect clutch assembly (5).



21. INSTALL FIRST FRICTION CLUTCH PLATE (7).

    a. Coat first friction clutch plate (7) with transmission oil.

    b. Aline teeth on friction clutch plate (7) with teeth on clutch plate hub (8). Install friction clutch plate.

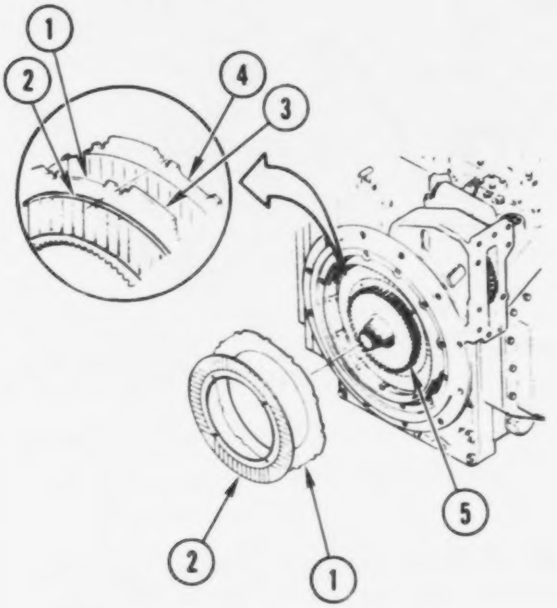
22. INSTALL SECOND CLUTCH PLATE (1) AND SECOND FRICTION CLUTCH PLATE (2).

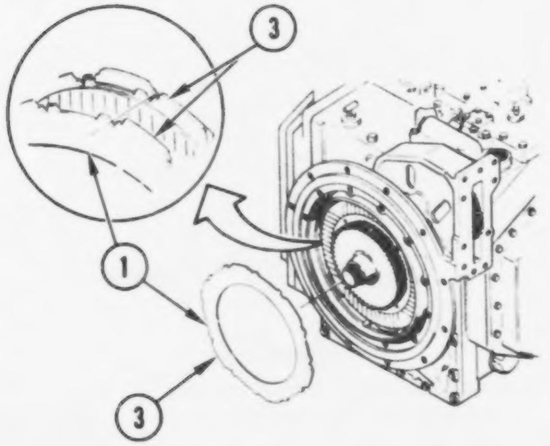
    a. Coat second clutch plate (1) with transmission oil.

    b. Aline tangs (3) of second clutch plate (1) with low spots (4) of first clutch plate. Install second clutch plate.

    c. Coat second friction clutch plate (2) with transmission oil.

    d. Aline teeth on second friction clutch plate (2) with teeth on hub (5). Install second friction clutch plate.

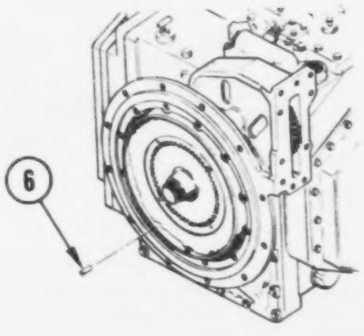




23. INSTALL THIRD CLUTCH PLATE (1).

    a. Coat third clutch plate (1) with transmission oil.

    b. Aline tangs (3) of third clutch plate (1) with tangs of second clutch plate. Install third clutch plate.



24. INSTALL TEN SPACERS (6).

    a. Put ten spacers (6) in place. Press in until they bottom.

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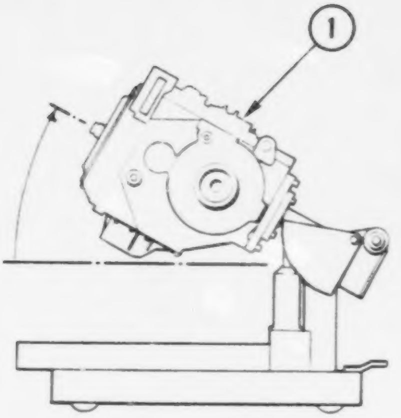
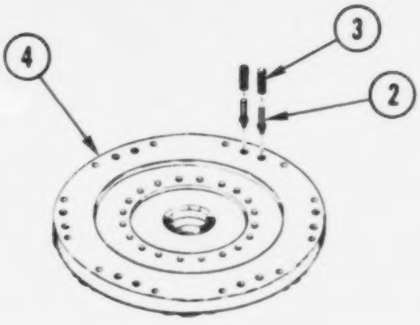


CAUTION

Do not lower transmission below horizontal position. Parts may fall out and be damaged.

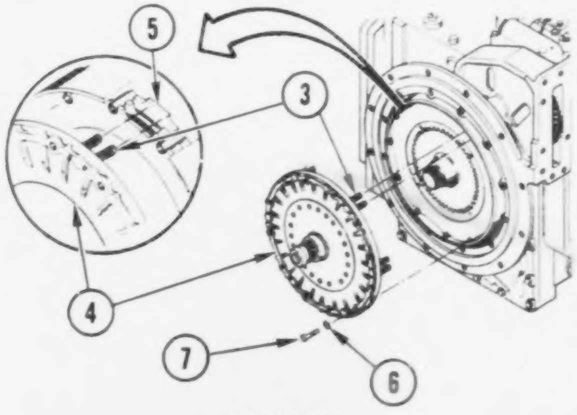
25. SLOWLY LOWER TRANSMISSION (1) TO HORIZONTAL POSITION.



NOTE

New springs must be used with new clutch plates.

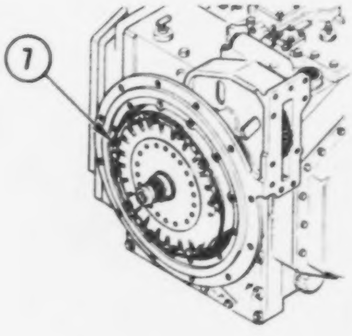
26. INSTALL 12 PINS (2) AND SPRINGS (3) IN PLATE ASSEMBLY (4).
    a. Firmly seat 12 pins (2) in plate assembly (4).
    b. Place spring (3) on each pin (2).



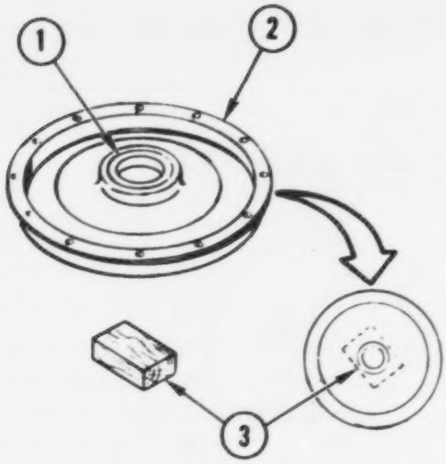
CAUTION

Do not allow springs to fall off plate assembly. Damage to equipment can result.

27. INSTALL PLATE ASSEMBLY (4).
    a. Install plate assembly (4) so that pins and springs (3) are positioned against tangs (5). Hold plate assembly in place.
    b. Alternately install 12 washers (6) and screws (7).



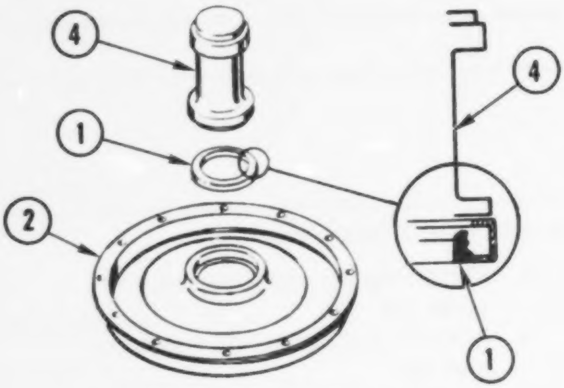
28. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 12 SCREWS (7) TO 28-30 ft-lb (4 mkg).



29. IF SEAL (1) WAS REMOVED FROM COVER (2), GO TO STEP 30. IF NOT, GO TO STEP 32.

30. POSITION COVER (2).

   a. Position cover (2) on one 2- by 4- by 6-inch wood block (3).



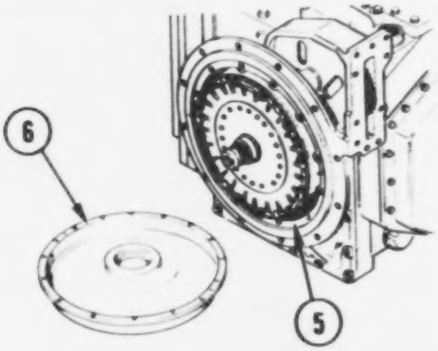
CAUTION
Do not install seal without properly blocking cover. Damage to cover can occur.

31. INSTALL NEW SEAL (1).

   a. Coat inside of new seal (1) with transmission oil.

   b. Fit large end of oil seal replacer (4) into new seal (1).

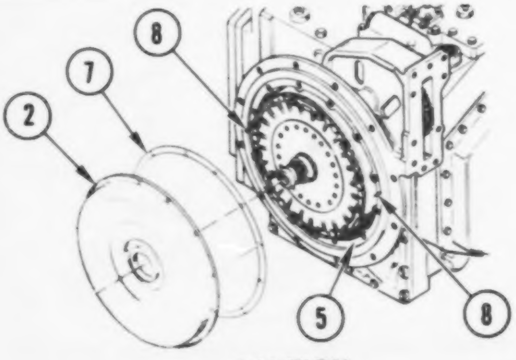
   c. Coat outside of seal (1) with sealant compound. Using plastic-faced hammer, tap seal into cover (2).



WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

32. CLEAN MOUNTING SURFACES (5) AND (6).

   a. Use wiping rag dampened with cleaning solvent.



CAUTION
Do not allow lip of seal to catch on shaft. Seal may leak causing damage to equipment.

33. POSITION NEW GASKET (7) AND COVER (2).

   a. Apply petrolatum to gasket mounting surface (5).

   b. Aline new gasket (7) with pins (8), and position on mounting surface (5).

   c. Aline cover (2) with pins (8), and position on mounting surface (5).

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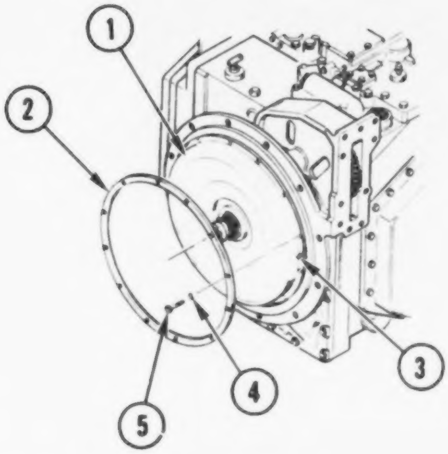


34. SECURE COVER (1).
    - a. Place ring (2), flat side out, on cover (1).
    - b. Aline ring (2) with bolt holes and pins (3).
    - c. Install 12 new lock washers (4) and bolts (5).

35. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE 12 BOLTS (5) TO 75-85 in-lb (86-98 cmkg).

END OF TASK

REPLACE PRIORITY VALVE PISTON

DESCRIPTION

This task covers: Remove (page 4-61). Install (page 4-63).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Micrometer caliper set — (Item 52, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Gasket
Lock washer (4)

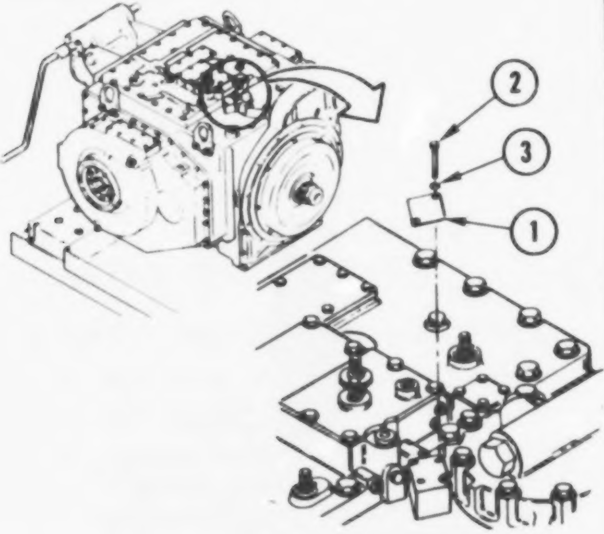
Personnel Required:

Track Veh Rep 63H10

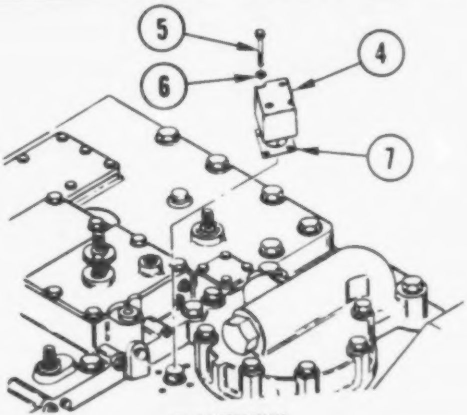
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



1. REMOVE ACCESS COVER (1).
   a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove two screws (2) and lock washers (3). Discard lock washers.
   b. Remove cover (1).



CAUTION

Priority valve cover is under spring pressure. Slowly remove cover to prevent loss of parts.

2. REMOVE PRIORITY VALVE COVER (4).
   a. Using 3/8-inch drive brace handle and 7/16-inch socket, loosen two screws (5) and lock washers (6). Unscrew each screw one turn at a time until spring pressure is relieved.
   b. Remove two screws (5) and lock washers (6). Discard lock washers.
   c. Remove cover (4) and priority valve gasket (7). Discard gasket.

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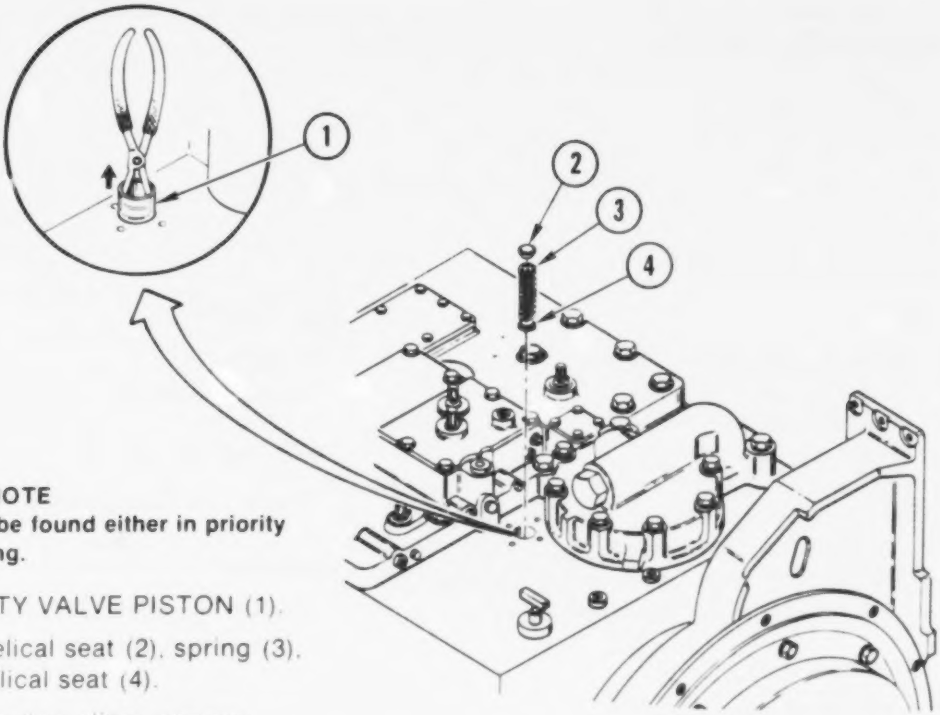
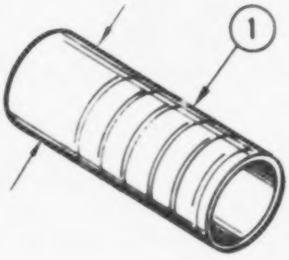
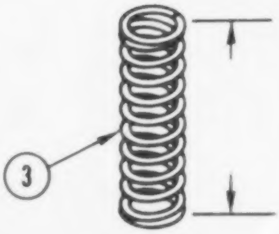


NOTE
Top helical seat may be found either in priority valve cover or on spring.

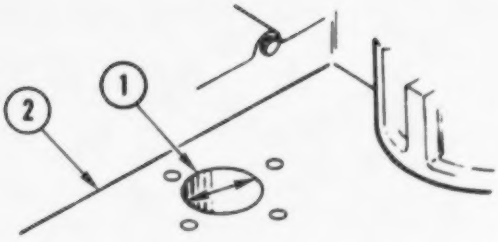
3. REMOVE PRIORITY VALVE PISTON (1).
   a. Remove top helical seat (2), spring (3), and bottom helical seat (4).
   b. Using retaining-ring pliers, remove piston (1).



4. CHECK PISTON (1).
   a. Using micrometer caliper set, measure outside diameter of piston (1).
   b. Replace piston (1) if measurement is less than 1.4965 inches (38.011 mm).



5. CHECK SPRING (3).
   a. Using indicator caliper, measure free length of spring (3). Replace spring if free length is less than 5.77 inches (146.6 mm).

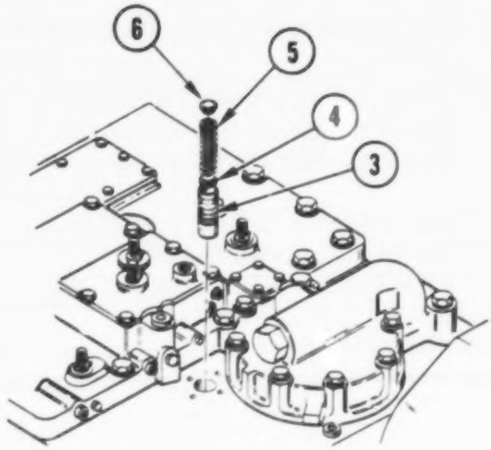


6. CHECK HOUSING BORE (1).

   a. Using micrometer caliper set and telescoping gage set, measure diameter of housing bore (1).

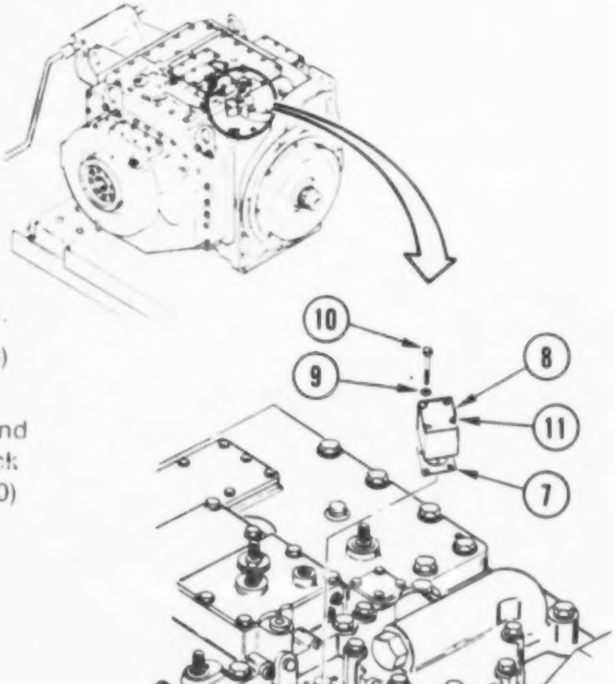
   b. If measurement is greater than 1.5015 inches (38.138 mm), return reassembled housing (2) to depot.

INSTALL



NOTE
Piston is installed with open end up.

7. INSTALL PISTON (3), BOTTOM HELICAL SEAT (4), SPRING (5), AND TOP HELICAL SEAT (6).



8. INSTALL NEW GASKET (7).

9. INSTALL PRIORITY VALVE COVER (8).

   a. Aline holes in priority valve cover (8) with holes in new gasket (7).

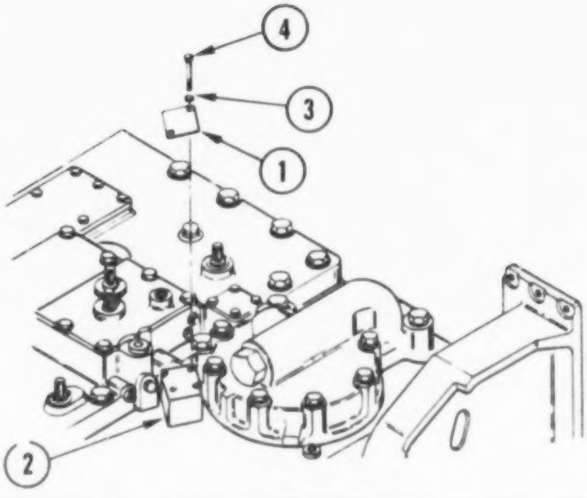
   b. Using 3/8-inch drive brace handle and 7/16-inch socket, install two new lock washers (9) and two long screws (10) in holes (11). Install each screw evenly one turn at a time.

10. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (10) TO 85-95 in-lb (98-109 cmkg).

GO TO NEXT PAGE

11. INSTALL COVER (1).
    a. Position cover (1) over priority valve cover (2).
    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install two new lock washers (3) and screws (4).

12. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (4) TO 85-95 in-lb (98-109 cmkg).



END OF TASK

REPLACE PRESSURE RELIEF VALVE

DESCRIPTION

This task covers: Remove (page 4-65). Install (page 4-66).

INITIAL SETUP

Tools:

General mechanic's tool kit: automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Socket wrench adapter — (Item 77, App C)
Socket wrench set — (Item 87, App C)
Torque wrench — (Item 101, App C)

Materials/Parts:

Gasket

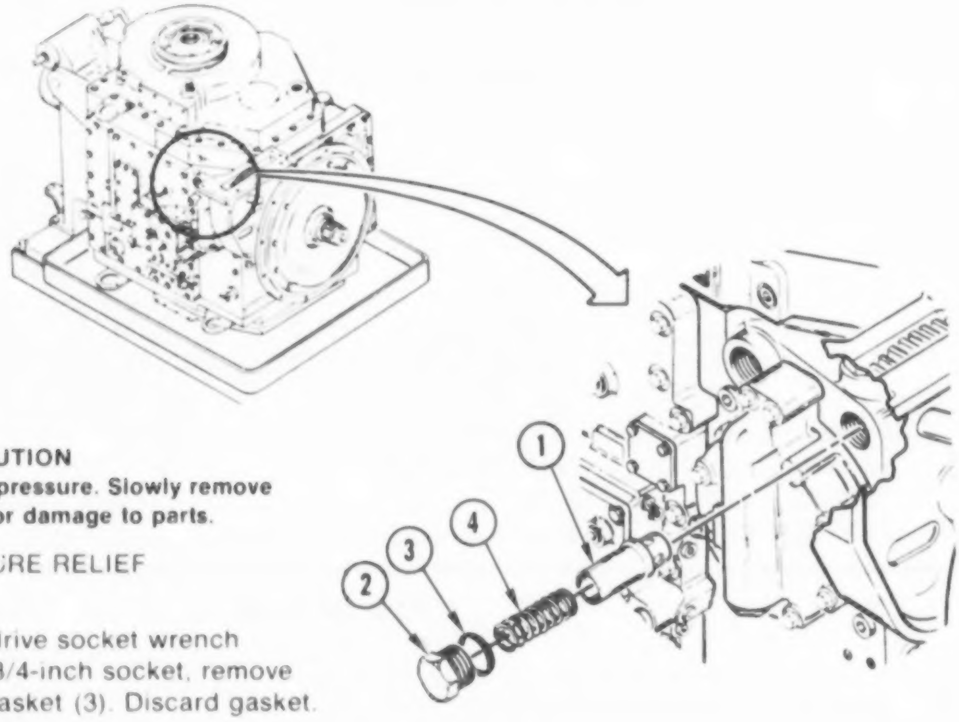
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



CAUTION

Plug is under spring pressure. Slowly remove plug to prevent loss or damage to parts.

1. REMOVE PRESSURE RELIEF VALVE (1).
   - a. Using 1-inch drive socket wrench handle and 1 3/4-inch socket, remove plug (2) and gasket (3). Discard gasket.
   - b. Remove spring (4).
   - c. Take out relief valve (1).

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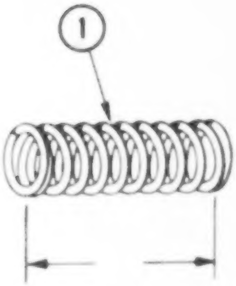
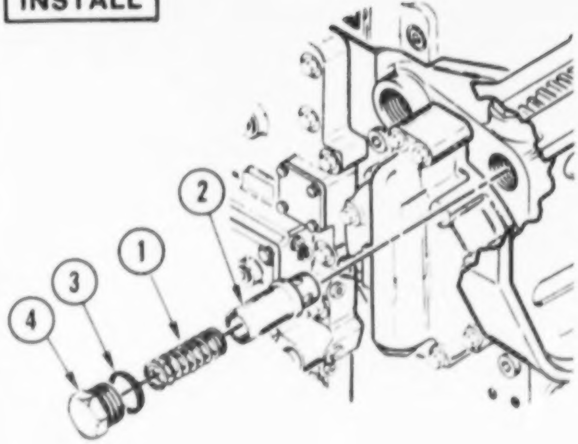
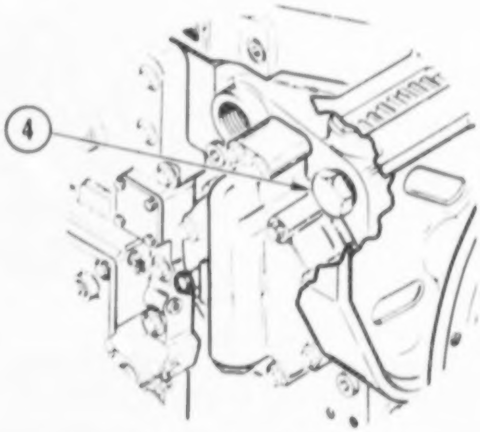


2. CHECK SPRING (1).
   a. Using indicator caliper, measure free length of spring (1). Replace spring if free length is less than 3.28 inches (83.3 mm).

INSTALL



3. INSTALL RELIEF VALVE (2).
   a. Install relief valve (2) with small end first.
   b. Install spring (1).
   c. Install new gasket (3).
   d. Using 1-inch drive socket wrench handle and 1 3/4-inch socket, install plug (4).



4. USING 3/4-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 1 3/4-INCH SOCKET, TORQUE PLUG (4) TO 200-220 ft-lbs (28-30 mkg).

END OF TASK

INSPECT TRANSMISSION FOR CONTAMINATION

DESCRIPTION

This task covers: Disassemble (page 4-67). Assemble (page 4-73).

INITIAL SETUP

Tools:

- Fluid gun — (Item 31, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Impact socket set — (Item 38, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Socket wrench adapter — (Item 76, App C)
- Socket wrench attachment — (Item 85, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Measuring device — 1/4 to 1/2 teaspoon

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Sealant compound — (Item 11, App B)

Materials/Parts: (cont)

- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)
- Fluid pressure parts kit
- Gasket
- Gasket
- Hydraulic o-ring packing
- Lock washer (4)
- Lock washer (17)
- Preformed packing
- Preformed packing (2)
- Preformed packing

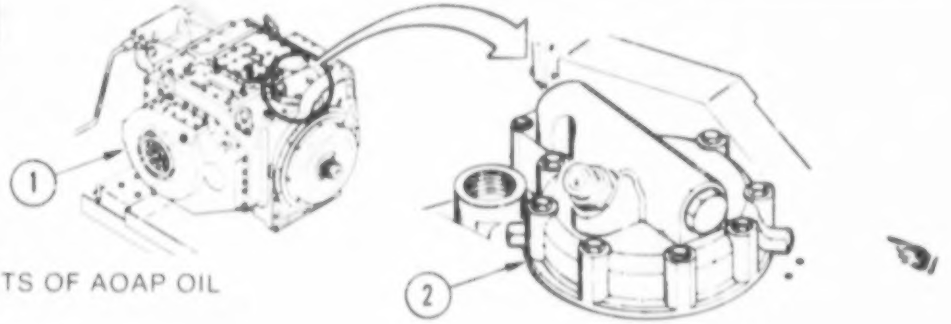
Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

Equipment Conditions:

- Transmission mounted on tip-over stand. See page 2-144.

DISASSEMBLE



1. REVIEW RESULTS OF AOAP OIL ANALYSIS.

   a. Note if contamination in transmission (1) is not within accepted limits.

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

CAUTION

Loose dirt on and around oil filter cover assembly can fall into transmission when cover is removed. Dirt inside transmission will cause damage.

2. CLEAN OIL FILTER COVER ASSEMBLY (2) AND AREA AROUND ASSEMBLY.

   a. Use wiping rag dampened with cleaning solvent.

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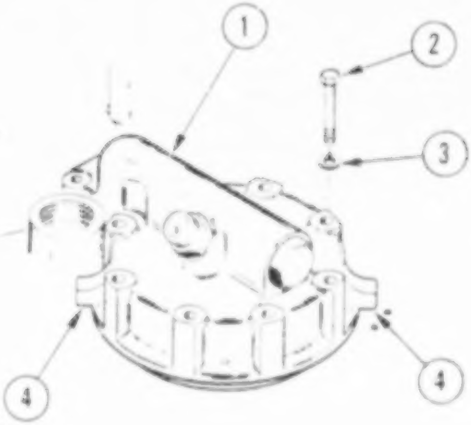
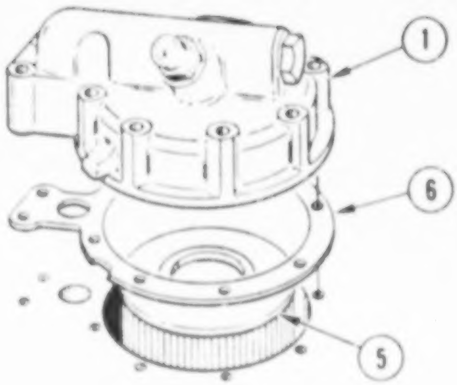


3. LOOSEN COVER ASSEMBLY (1).

a. Remove 10 screws (2) and lock washers (3). Discard lock washers.

b. Pry under two tabs (4) a little at a time until cover assembly (1) is loose.



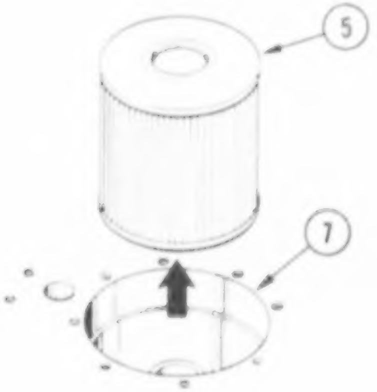
NOTE

Filter element may come out with cover assembly.

4. REMOVE COVER ASSEMBLY (1).

a. Remove cover assembly (1). If oil filter element (5) comes out with cover assembly, separate element from assembly.

5. REMOVE AND DISCARD OIL FILTER GASKET (6).



6. INSPECT ELEMENT (5).

a. Pull element (5) straight up and out of oil filter cavity (7).

b. Note if element (5) is damaged.

7. DISCARD ELEMENT (5).

8. CHECK FILTER CAVITY (7).

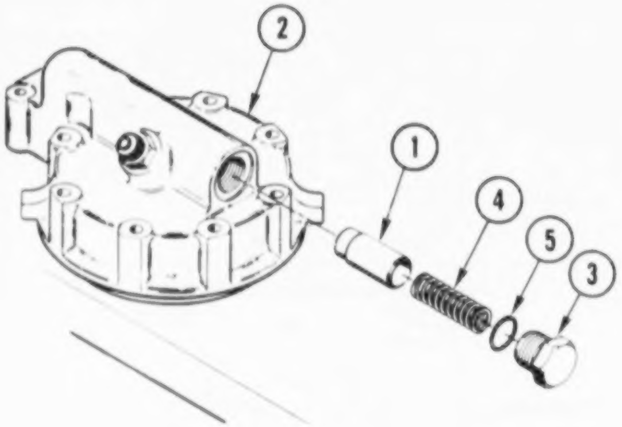
a. Using fluid gun, remove remaining oil from filter cavity (7).

b. Using measuring device, check cavity (7) for metal chips and note contamination.

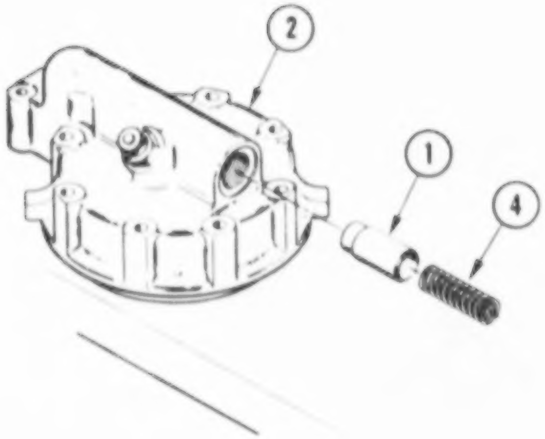
c. If element was damaged or more than 1/4 tsp (1 cc) of chips are found, go to step 9. If not, got to step 15.

CAUTION

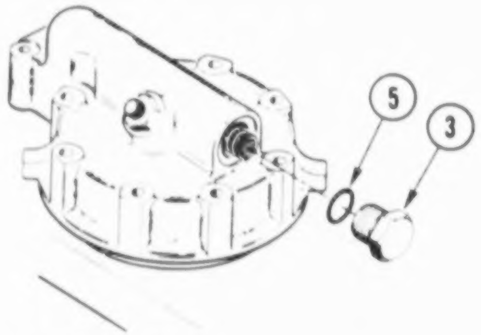
Bolt is under spring pressure. Use care when removing bolt. Failure to do so can result in loss of parts.



9. REMOVE BYPASS VALVE PISTON (1) FROM COVER ASSEMBLY (2).
   a. (H) Hold cover assembly (2) on workbench.
   b. Using adapter and 35-mm socket, remove bolt (3) releasing spring (4) and piston (1). Remove spring and piston.
   c. If piston (1) is stuck in cover assembly (2), go to step 10. If piston comes out, remove and discard preformed packing (5). Go to step 12.
10. REPAIR OIL FILTER COVER, ASSEMBLY, page 3-21.
11. GO TO STEP 15.



12. INSERT PISTON (1) AND SPRING (4) IN COVER ASSEMBLY (2).



13. INSTALL BOLT (3).
   a. Coat new preformed packing (5) with transmission oil and install on bolt (3).
   b. Push in and turn bolt (3) until threads catch.
   c. Using adapter and 35-mm socket, install bolt (3).
14. USING 1/2-INCH DRIVE TORQUE WRENCH, ADAPTER, AND 35-MM SOCKET, TORQUE BOLT (3) TO 45-50 ft-lb (6-7 mkg).

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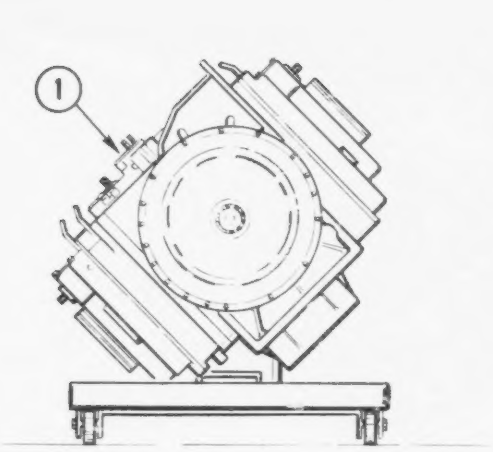
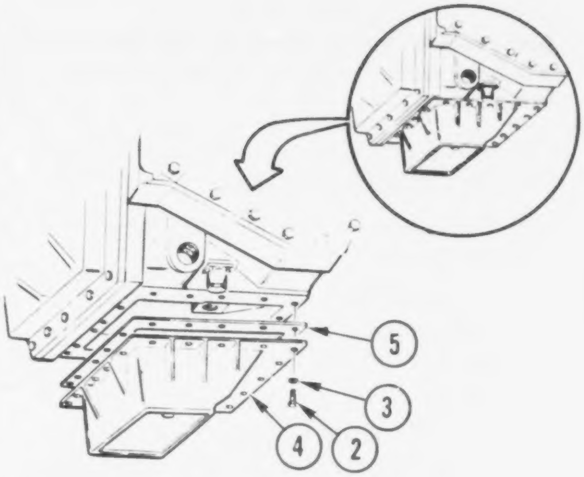


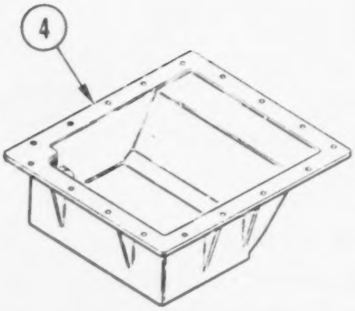
NOTE
Transmission is rotated 45 degrees to prevent contents of sump cover from spilling into transmission.

15. POSITION TRANSMISSION (1).
    a. Rotate transmission (1) so top is at a forty-five degree angle.



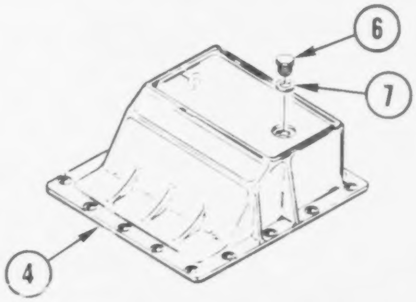
16. REMOVE 17 BOLTS (2).
    a. Remove 17 bolts (2) and lock washers (3). Discard lock washers.

17. REMOVE SUMP COVER (4).
    a. Remove cover (4) and gasket (5). Discard gasket.



18. USING MEASURING DEVICE, CHECK INSIDE OF SUMP COVER (4) FOR METAL CHIPS.
    a. Note contamination if there is more than 1/2 tsp (2 cc) of metal chips.

19. IF CONTAMINATION WAS NOTED IN STEPS 1, 8, OR 18, GO TO STEP 20. IF NOT, EFFORT IS COMPLETE. GO TO END OF TASK

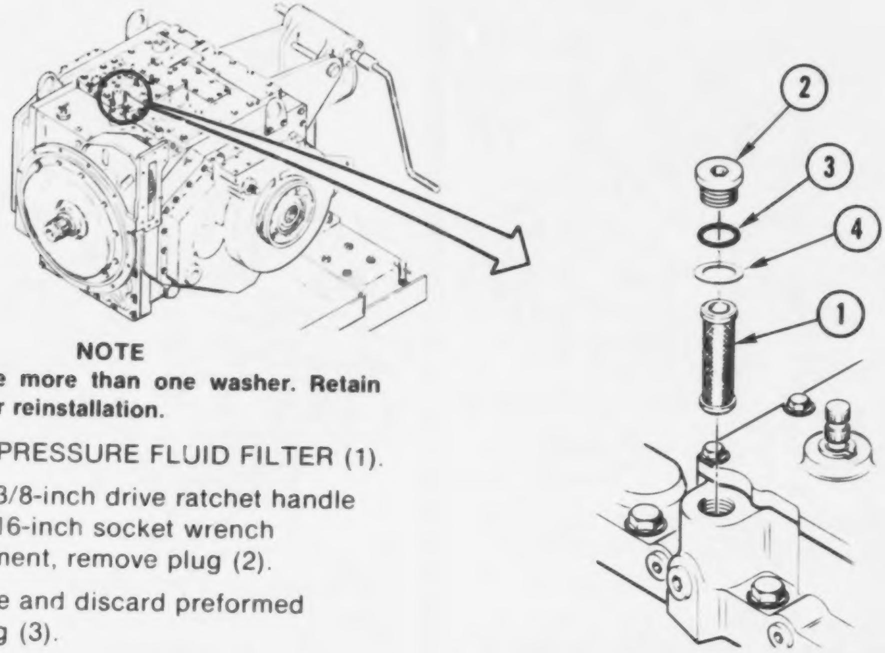


20. REMOVE PLUG (6) AND GASKET (7). DISCARD GASKET.

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

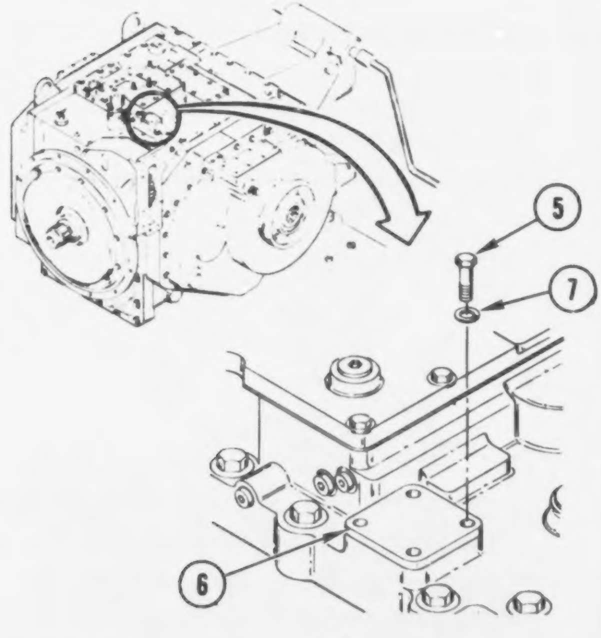
21. CLEAN PLUG (6) AND INSIDE OF SUMP COVER (4).
    a. Use wiping rag dampened with cleaning solvent.



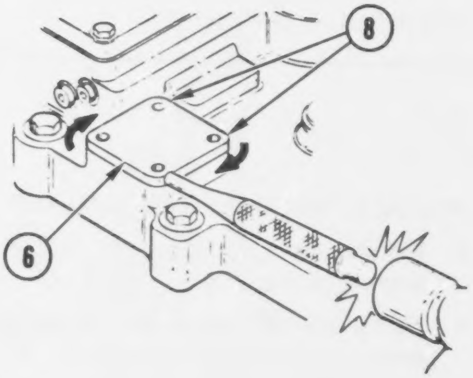
NOTE

There may be more than one washer. Retain all washers for reinstallation.

22. REMOVE PRESSURE FLUID FILTER (1).
    a. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, remove plug (2).
    b. Remove and discard preformed packing (3).
    c. Remove spring washer(s) (4) and filter (1).



23. REMOVE SCREWS (5) FROM CONTROLLER CAP (6).
    a. Remove four screws (5) and lock washers (7). Discard lock washers.



24. REMOVE CAP (6).
    a. Using hammer and punch, rotate cap (6) to the right. Rotate until pry bar can be placed under a corner (8) of cap.
    b. Using pry bar under cap (6), pry up cap and lift off.

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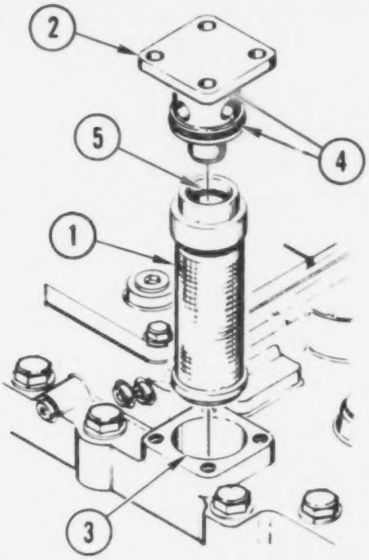
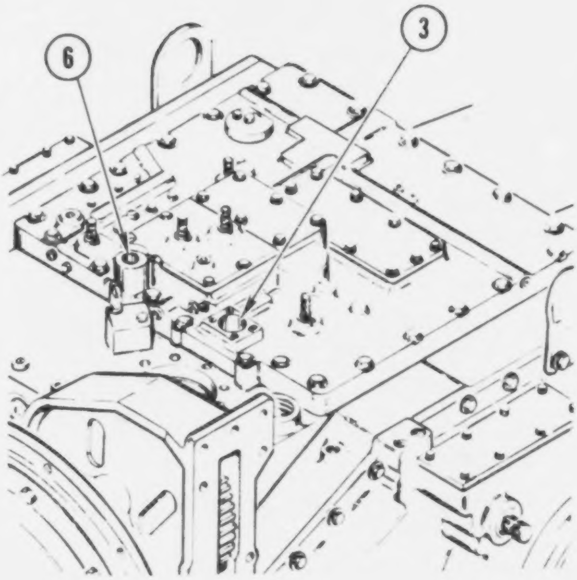


NOTE

Filter element may be found either on cap or in cavity.

25. REMOVE FLUID FILTER ELEMENT (1).
    a. Pull element (1) from cap (2) or cavity (3).

26. REMOVE AND DISCARD TWO PREFORMED PACKINGS (4) AND HYDRAULIC O-RING (5).

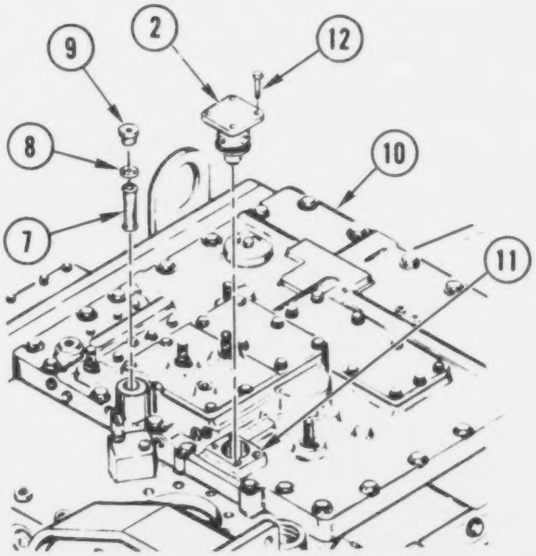


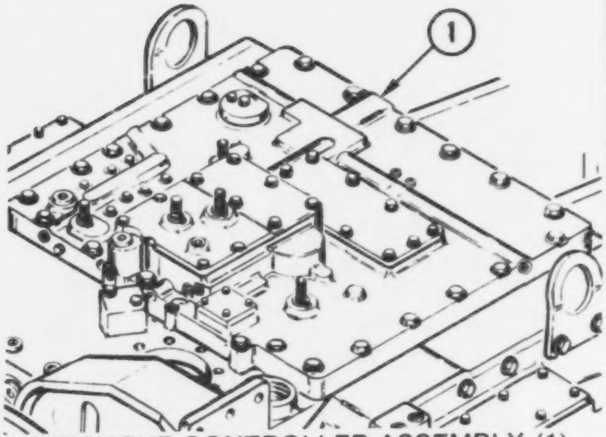
27. INSPECT CAVITIES (6) AND (3).
    a. If metal chips are found in either cavity (6) or (3), go to step 28. If not, go to step 33.

---

28. INSTALL PRESSURE FLUID FILTER (7).
    a. Install filter (7) and spring washer(s) (8).
    b. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, install plug (9).

29. INSTALL CONTROLLER FLUID FILTER CAP (2).
    a. Push cap (2) into controller (10).
    b. Aline screw holes (11).
    c. Tap and seat cap (2) into place.
    d. Install four screws (12).

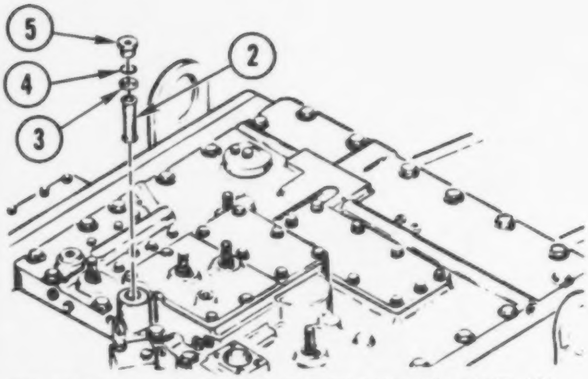




30. REMOVE CONTROLLER ASSEMBLY (1). See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

31. REPLACE CONTROLLER ASSEMBLY (1). RECORD FAILURE ON DA FORM 2407 AND RETURN CONTAMINATED CONTROLLER TO DEPOT.

32. EFFORT IS COMPLETE. GO TO END OF TASK.

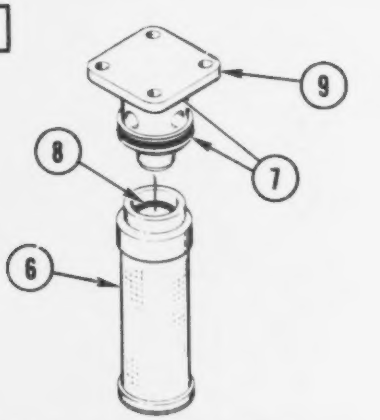


33. INSTALL PRESSURE FLUID FILTER (2).

   a. Install filter (2) and spring washer(s) (3).
   b. Coat new preformed packing (4) with transmission oil. Install packing on plug (5).
   c. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, install plug (5).

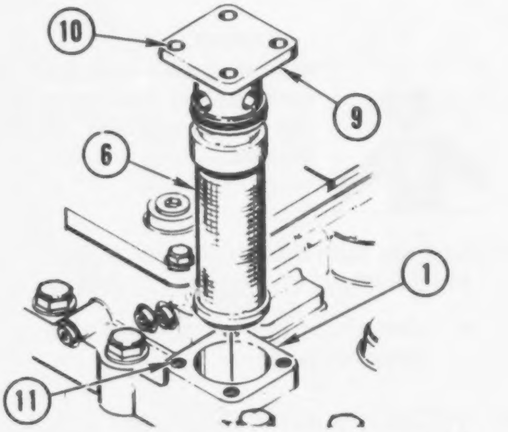
34. EFFORT IS COMPLETE. GO TO END OF TASK.

ASSEMBLE



35. INSTALL CONTROLLER FLUID FILTER ELEMENT (6) IF REMOVED.

   a. Coat two new preformed packings (7) and o-ring (8) with transmission oil.
   b. Install two new packings (7) on cap (9).
   c. Install new o-ring (8) in top of element (6).
   d. Install element (6) on cap (9).



36. INSTALL CAP (9) WITH ELEMENT (6).

   a. Push cap (9) with element (6) into cavity in controller assembly (1).
   b. Aline four screw holes (10) in cap (9) with screw holes (11) in controller assembly (1).
   c. Using plastic-faced hammer, tap and seat cap (9) into place.

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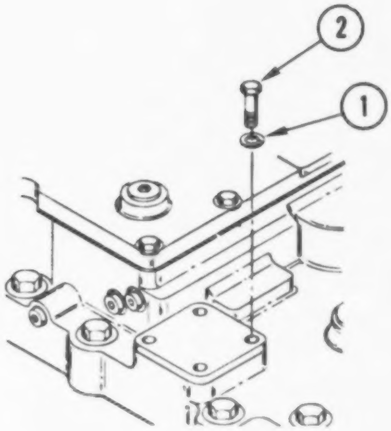
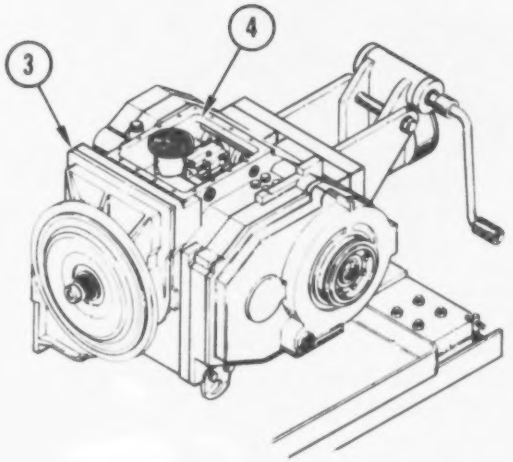
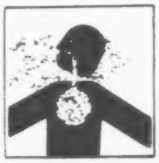


37. INSTALL FOUR NEW LOCK WASHERS (1) and SCREWS (2).

38. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (2) TO 85-110 in-lb (98-127 cmkg).



39. POSITION TRANSMISSION (3).
   a. Rotate transmission (3) so sump opening (4) is on top.



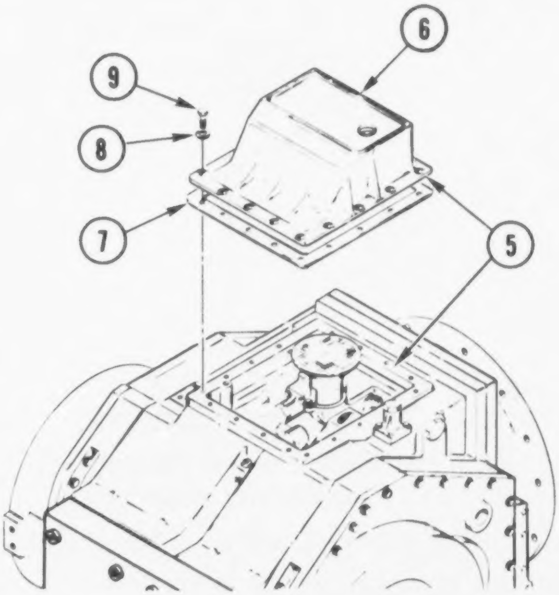
WARNING

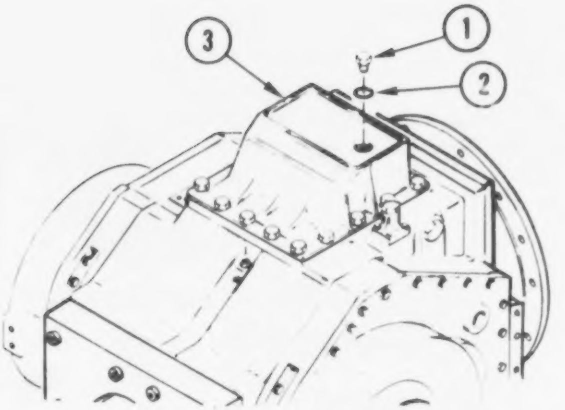
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

40. CLEAN MATING SURFACES (5). AND INSIDE OF SUMP COVER (6)
   a. Use wiping rag dampened with cleaning solvent.

41. INSTALL SUMP COVER (6).
   a. Position new gasket (7) and sump cover (6) on housing.
   b. Install 17 new lock washers (8) and bolts (9).

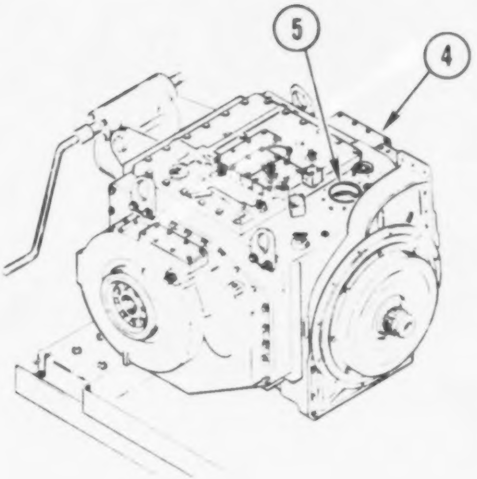
42. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 17 BOLTS (9) TO 15-20 ft-lb (2-3 mkg).



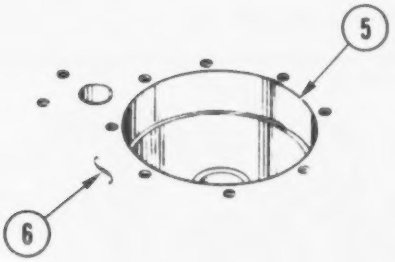


43. INSTALL PLUG (1), IF REMOVED.
    a. Install new gasket (2) on plug (1).
    b. Apply sealant compound to threads of plug (1).
    c. Install plug (1) in sump cover (3).

44. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE PLUG (1) TO 55-60 ft-lbs (8 mkg).



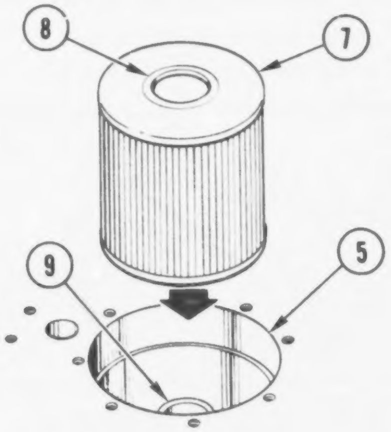
45. POSITION TRANSMISSION (4).
    a. Rotate transmission (4) so oil filter cavity (5) is on top.



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

46. CLEAN MOUNTING SURFACE (6) AND CAVITY (5).
    a. Use wiping rag dampened with cleaning solvent.



47. INSTALL NEW ELEMENT (7).
    a. Coat preformed packing (8) on each end of new element (7) and spindle (9) with clean transmission oil.
    b. Put element (7) on spindle (9) and push it down into cavity (5) until firmly seated.

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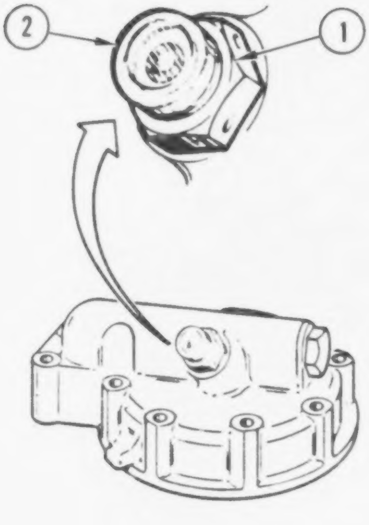
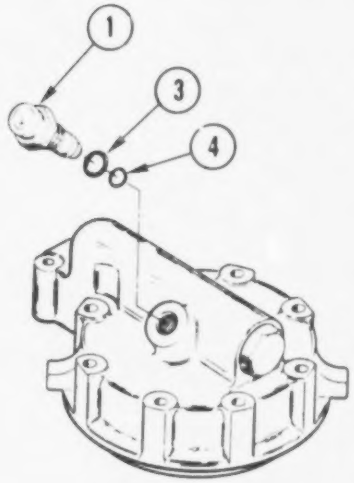


CAUTION

Flexible cover must be in position on pressure indicator at all times. Damage to equipment can occur.

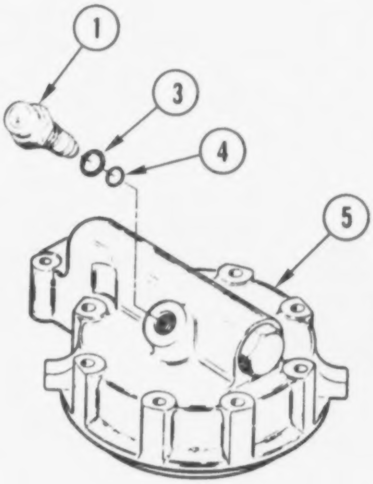
48. INSPECT PRESSURE INDICATOR (1).
    a. If flexible cover (2) is not on indicator (1), go to step 49.
    b. If flexible cover (2) is on indicator (1), go to step 52.



49. REMOVE PRESSURE INDICATOR (1).
    a. Unscrew indicator (1).
    b. Remove and discard preformed packings (3) and (4).

50. INSTALL NEW PRESSURE INDICATOR (1).
    a. Coat new preformed packings (3) and (4) with transmission oil.
    b. Install preformed packings (3) and (4) on indicator (1).
    c. Install new indicator (1) in cover (5).
    d. (H) Hold cover (5) on workbench.

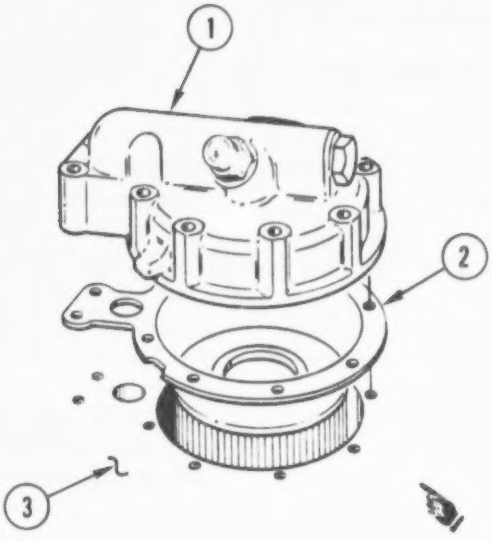
51. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE INDICATOR (1) TO 20-25 ft-lb (3 mkg).

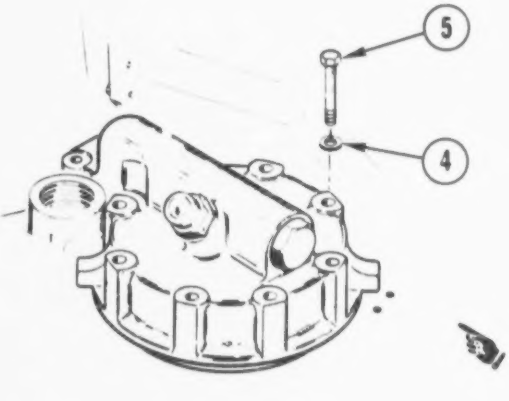


WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

52. CLEAN COVER ASSEMBLY (1).
    a. Use wiping rag dampened with cleaning solvent.

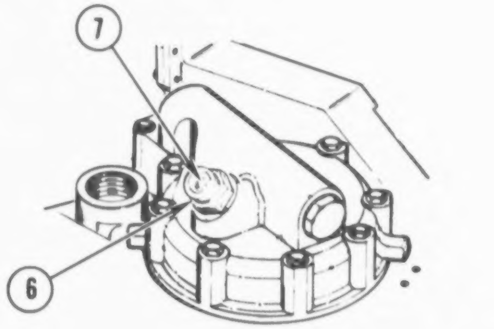
53. INSTALL COVER ASSEMBLY (1).
    a. Put new gasket (2) in place on mounting surface (3) and aline with screw holes.
    b. Aline cover assembly (1) with gasket (2). Press assembly in place.





54. INSTALL 10 NEW LOCK WASHERS (4) AND SCREWS (5).

55. USING 1/2-INCH DRIVE TORQUE WRENCH, EVENLY TORQUE 10 SCREWS (5) to 30-35 ft-lb (4-5 mkg).



56. RESET PRESSURE INDICATOR (6).
    a. Press button (7) on indicator (6).

END OF TASK

Section II. DISCONNECT CLUTCH ASSEMBLY

TASK INDEX

Task	Page
Replace Disconnect Clutch Assembly	4-78
Repair Disconnect Clutch Assembly	4-82
Repair Piston Disconnect Clutch Housing Inserts	4-90
Repair Piston Disconnect Clutch Housing	4-91

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE DISCONNECT CLUTCH ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-78). Install (page 4-80).

INITIAL SETUP

Tools:

General mechanic's tool kit: automotive — (Item 33, App C)
Hex head screw (2) — (Item 37, App C)
Retaining-ring pliers — (Item 59, App C)
Slip-joint pliers — (Item 71, App C)

Materials/Parts:

Petrolatum—(Item 7, App B)

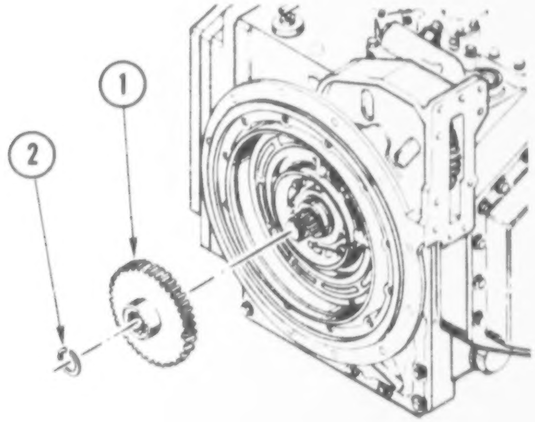
Personnel Required:

Track Veh Rep 63H10

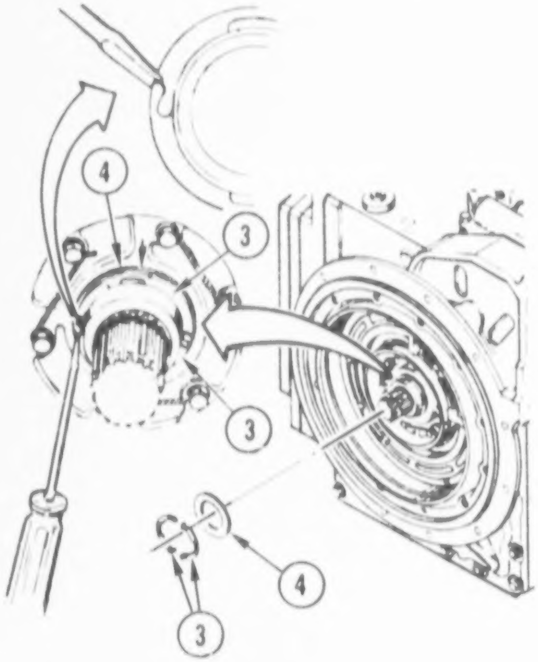
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

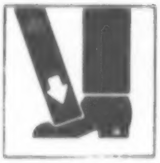
REMOVE



1. REMOVE DISCONNECT CLUTCH See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE CLUTCH PLATE HUB (1).
   a. Using retaining-ring pliers, remove retaining ring (2).
   b. Pull off hub (1).

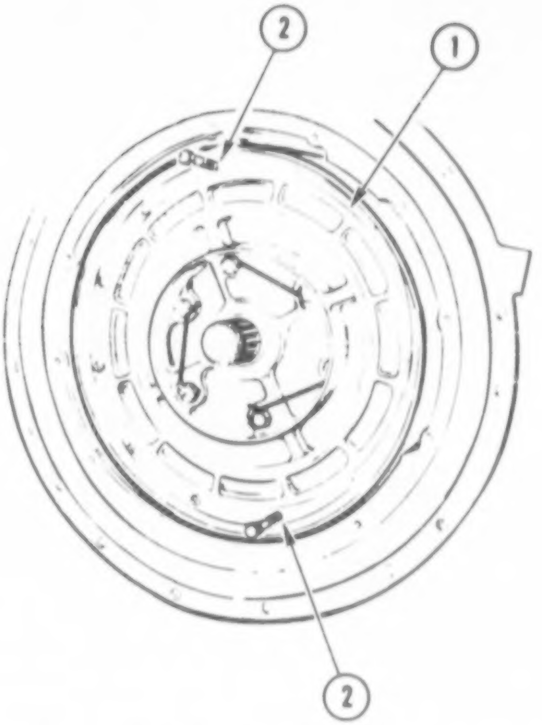


3. REMOVE TWO PIECE RETAINING RING (3).
   a. Using screwdriver, remove two piece retaining ring (3).
   b. Remove thrust washer (4).

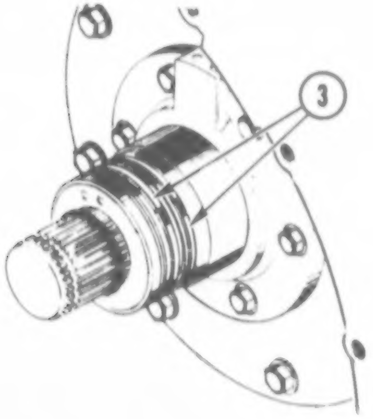


WARNING

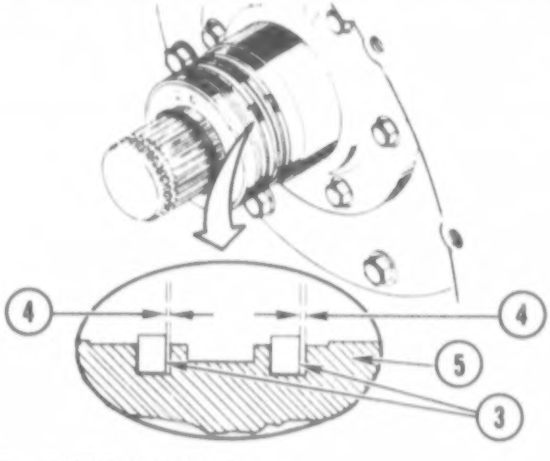
Disconnect clutch assembly is heavy and awkward. Remove slowly or clutch assembly can fall and injure personnel.



4. REMOVE DISCONNECT CLUTCH ASSEMBLY (1).
   a. Insert two 3/8-24 X 2-3/4-inch long hex head screws (backup plate mounting screws) (2) in opposite screw holes.
   b. Using two screws (2) as handles, pull out clutch assembly (1).
   c. Remove two screws (2) used for removal of clutch assembly.



5. INSPECT SHAFT SEALS (3).
   a. Inspect seals (3) for damage. See page 2-5.
   b. If seals (3) are not damaged, go to step 6. If seals are damaged, go to step 7.

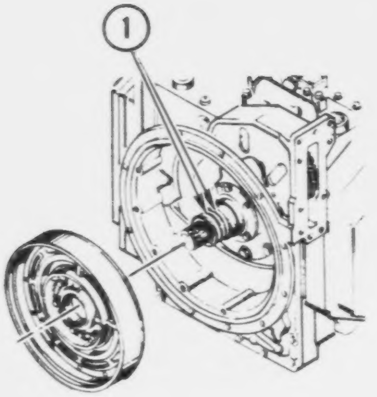


6. CHECK SEALS (3).
   a. Using feeler gage, measure gap (4) between seals (3) and body hub (5).
   b. If gap (4) is more than .010 inch (.254 mm), go to step 7. If not, go to step 8.

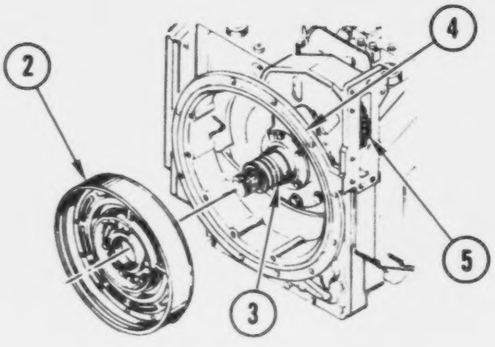
7. REPLACE INPUT BEVEL ASSEMBLY SHAFT SEALS. See page 4-122.

GO TO NEXT PAGE

INSTALL



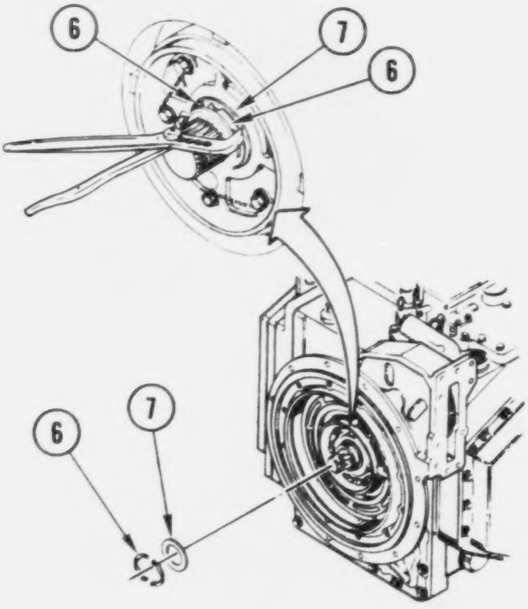
8. COAT TWO SEALS (1) WITH PETROLATUM.



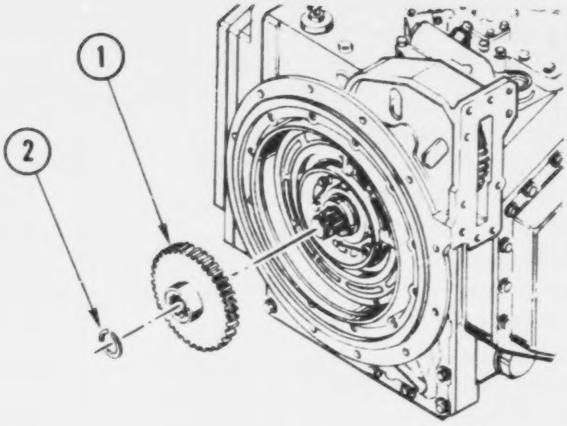
CAUTION
Do not force clutch assembly onto body hub. Seals can be damaged.

NOTE
If clutch assembly will not go all the way into power take-off assembly, turn spur gear while pushing in clutch assembly.

9. INSTALL CLUTCH ASSEMBLY (2).
   a. Install clutch assembly (2) on body hub (3).
   b. Push clutch assembly (2) all the way into power take-off assembly (4).
   c. Turn clutch assembly (2). Spur gear (5) should turn.



10. INSTALL TWO PIECE RETAINING RING (6).
    a. Install washer (7). Place groove side of washer in.
    b. Using large slip-joint pliers, install two piece retaining ring (6). Be sure sharp side of retaining ring faces out.



11. INSTALL HUB (1).
    a. Install hub (1).
    b. Using retaining ring pliers, install retaining ring (2).
12. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

END OF TASK

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REPAIR DISCONNECT CLUTCH ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-82). Assemble (page 4-87).

INITIAL SETUP

Tools:

- Arbor press — (Item 3, App C)
- Bearing installer — (Item 6, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Leather gloves — (Item 42, App C)
- Micrometer caliper set — (Item 52, App C)
- Socket wrench attachment — (Item 79, App C)
- Socket wrench set — (Item 89, App C)
- Telescoping gage set — (Item 93, App C)
- Thermal drying oven — (Item 94, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Wire-twister pliers — (Item 107, App C)
- Compressed air source, filtered, 30 psi (207 kPa) maximum

Materials/Parts:

- Lockwire — (Item 5, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Wood block (2) — (Item 4, App D)
- Preformed packing
- Preformed packing
- Preformed packing

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

References:

- TM 9-214

Equipment Conditions:

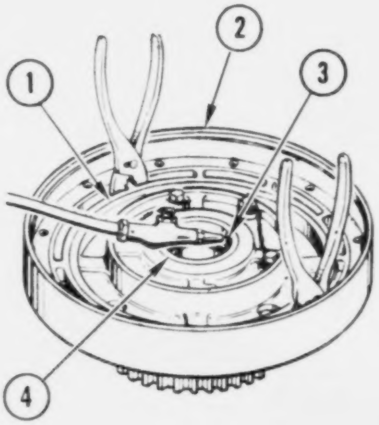
- Disconnect clutch assembly on workbench. See page 4-78.

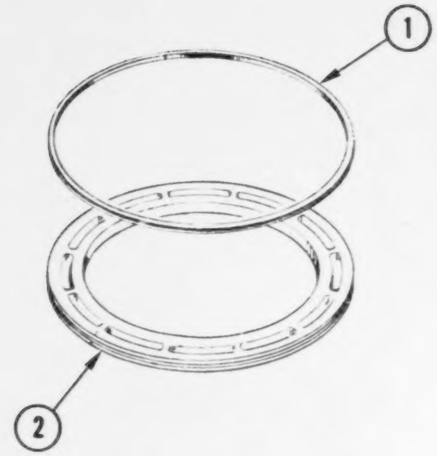
DISASSEMBLE

WARNING

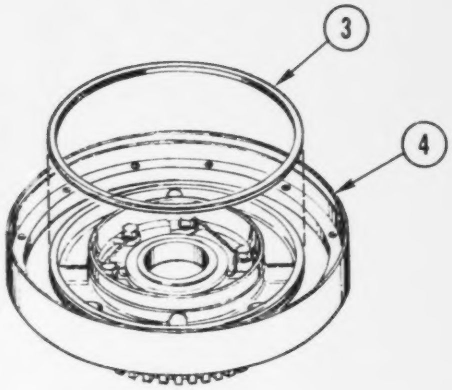
Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 30 psi (207 kPa) Always wear goggles.

1. REPAIRER AND HELPER SEPARATE CLUTCH PISTON (1) FROM PISTON DISCONNECT CLUTCH HOUSING (2).
   a. Loosen piston (1) from housing (2) by applying air pressure to oil ports (3) in bushing (4).
   b. Helper hold housing (2) and apply air pressure to oil ports (3) in bushing (4). Repairer, using two pliers, remove piston (1) evenly.

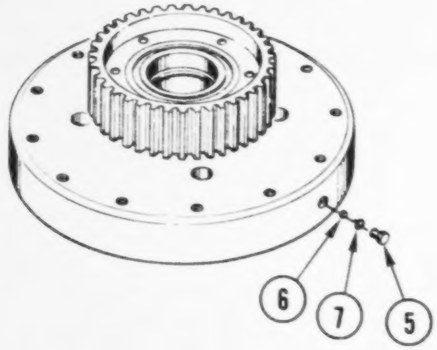




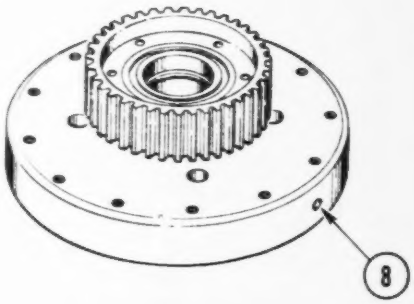
2. REMOVE PREFORMED PACKING (1) FROM PISTON (2). DISCARD PACKING.



3. REMOVE PREFORMED PACKING (3) FROM HOUSING (4). DISCARD PACKING.



4. REMOVE PLUG (5) AND BEARING BALL (6).
   a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove plug (5) and ball (6).
   b. Remove and discard preformed packing (7).
5. INSPECT BALL (6).
   a. Inspect ball (6) for damage. See page 2-5.
   b. Replace ball (6) if damaged.



6. INSPECT BALL SEAT (8).
   a. Inspect ball seat (8) for damage. See page 2-5.
   b. If ball seat (8) is damaged, go to step 7. If not, go to step 10.

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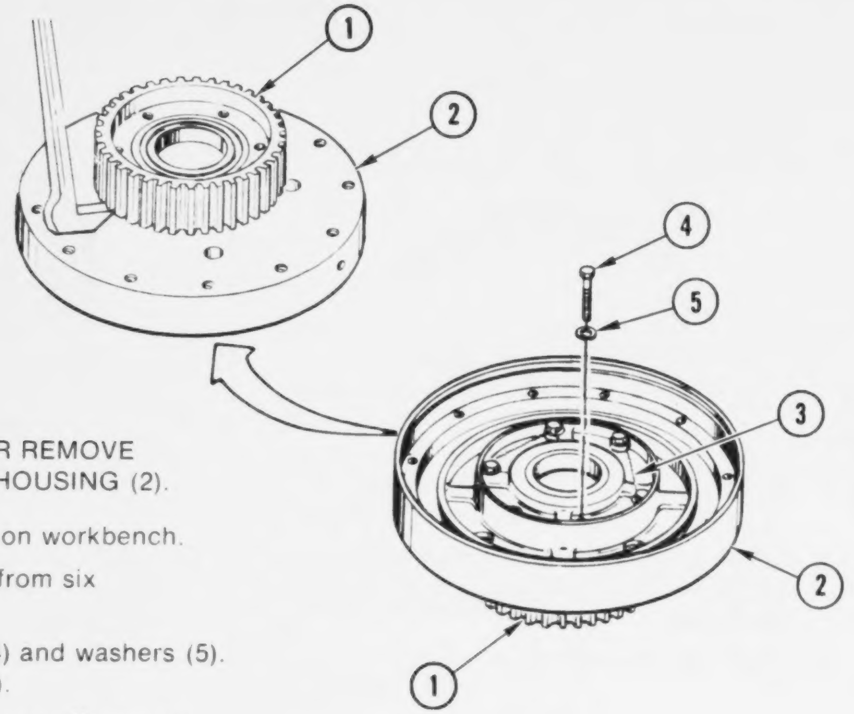


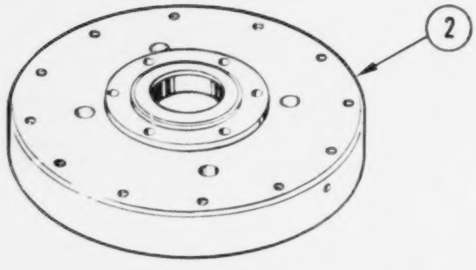
7. REPAIRER AND HELPER REMOVE SPUR GEAR (1) FROM HOUSING (2).

   a. (H) Hold housing (2) on workbench.

   b. Remove lockwire (3) from six screws (4).

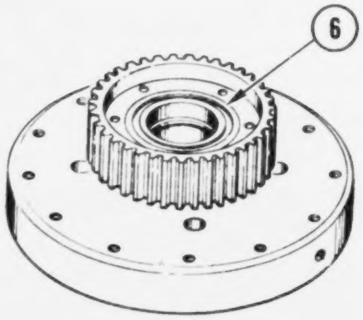
   c. Remove six screws (4) and washers (5). Turn over housing (2).

   d. Using pry bar, evenly pry off gear (1).



8. REPLACE HOUSING (2).

9. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING (2) TO DEPOT.

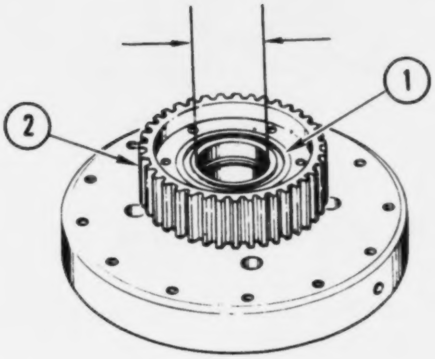


10. INSPECT BALL BEARING (6).

    a. Inspect bearing (6) for damage. See TM 9-214.

    b. If bearing (6) is not damaged, go to step 11. If bearing is damaged, go to step 12.

11. CHECK BEARING (1).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bearing (1).
    b. If measurement is greater than 3.1498 inches (80.005 mm), go to step 12.
    c. If measurement is 3.1498 inches (80.005 mm) or less, go to step 15.



12. IF GEAR (2) WAS NOT REMOVED, GO TO STEP 13. IF GEAR WAS REMOVED, GO TO STEP 14.

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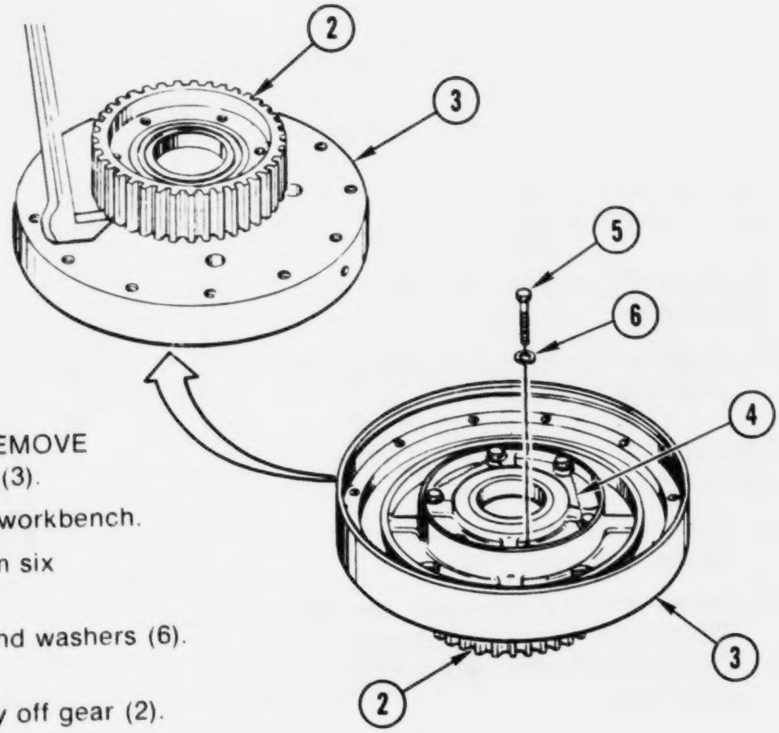
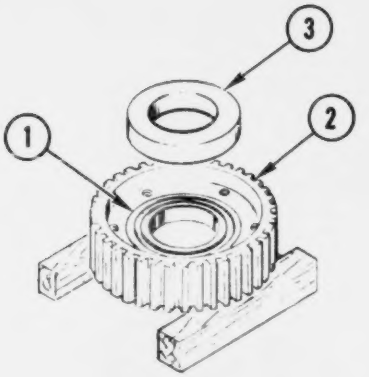
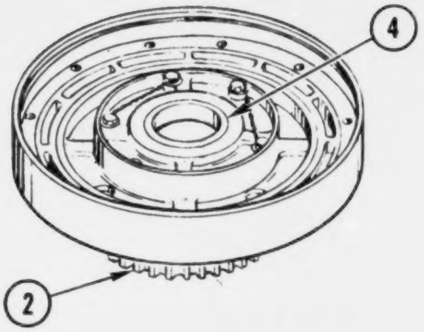
13. REPAIRER AND HELPER REMOVE GEAR (2) FROM HOUSING (3).
    a. (H) Hold housing (3) on workbench.
    b. Remove lockwire (4) from six screws (5).
    c. Remove six screws (5) and washers (6). Turn over housing (3).
    d. Using pry bar, evenly pry off gear (2).





14. REMOVE BEARING (1) FROM GEAR (2).
    a. Set up gear (2) in arbor press on two blocks of wood.
    b. Using bearing installer (3), press out bearing (1).



15. INSPECT BUSHING (4).
    a. Inspect bushing (4) for grooves, scoring, and scratches.
    b. If bushing (4) is damaged, go to step 16. If not, go to step 19.

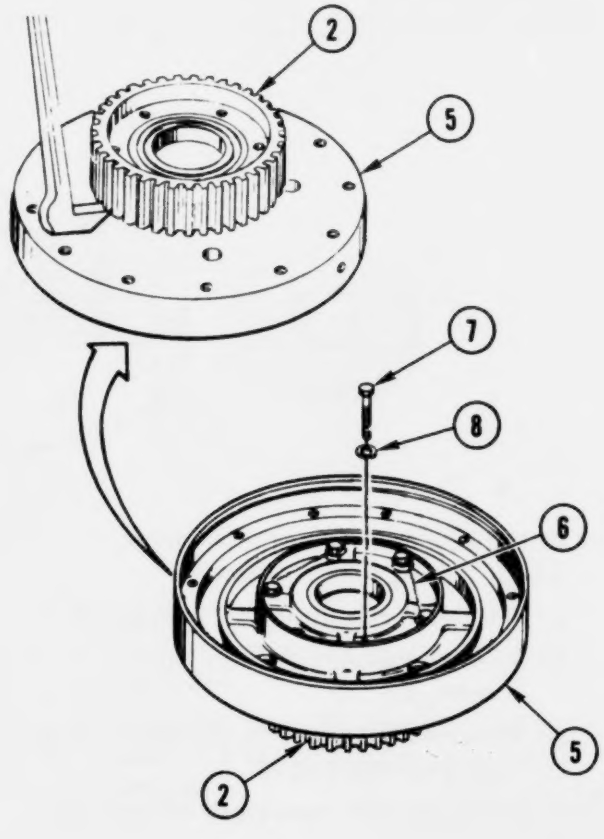
16. IF GEAR (2) WAS NOT REMOVED, GO TO STEP 17. IF GEAR WAS REMOVED, GO TO STEP 18.

17. REPAIRER AND HELPER REMOVE GEAR (2) FROM HOUSING (5).
    a. (H) Hold housing (5) on workbench.
    b. Remove lockwire (6) from six screws (7).
    c. Remove six screws (7) and washers (8). Turn over housing (5).
    d. Using pry bar, evenly pry off gear (2).

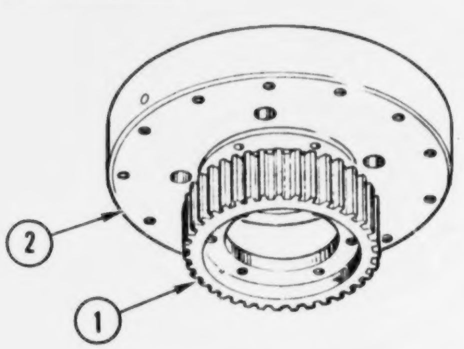
18. REPAIR PISTON DISCONNECT CLUTCH HOUSING, page 4-91.

19. CLEAN DISCONNECT CLUTCH ASSEMBLY.
    a. Clean assembly and hardware. See page 2-2.

20. INSPECT DISCONNECT CLUTCH ASSEMBLY.
    a. Inspect assembly, hardware and inserts. See page 2-5.
    b. Repair inserts if damaged. See task REPAIR PISTON DISCONNECT CLUTCH HOUSING INSERTS, page 4-90.



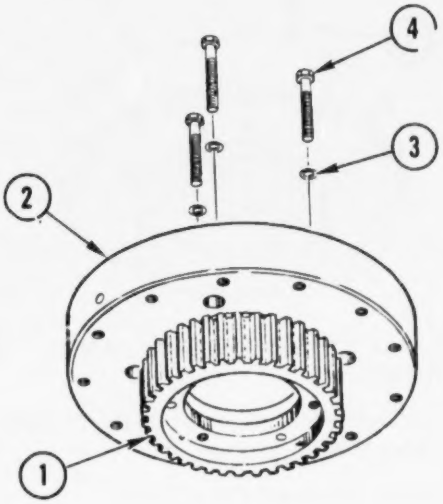
ASSEMBLE



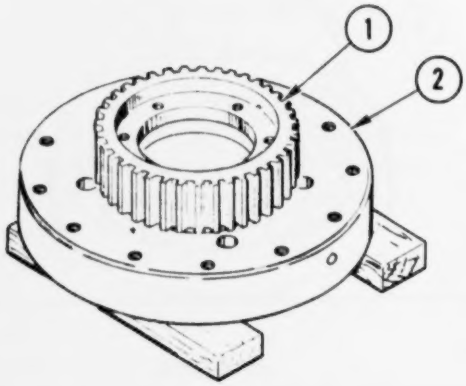
21. IF GEAR (1) WAS REMOVED, HEAT GEAR TO 200° F (93° C) IN OVEN FOR 30 MINUTES. IF NOT, GO TO STEP 30.

WARNING
Do not handle hot or cold parts without protective gloves. Personnel can be injured.

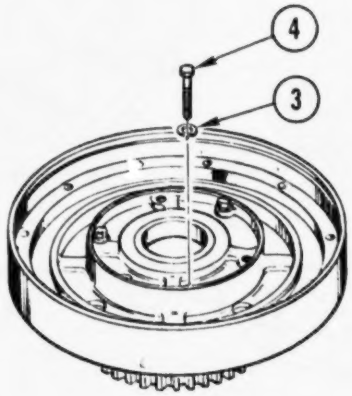
22. USING GLOVES, REMOVE GEAR (1) FROM OVEN AND PLACE HOUSING (2) ON GEAR.



23. POSITION GEAR (1).
    a. Aline screw holes of gear (1) and housing (2).
    b. Install three washers (3) and screws (4) in every other mounting hole to aline gear (1). Do not tighten.

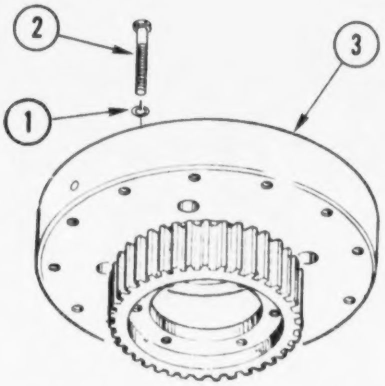


24. PRESS GEAR (1) ONTO HOUSING (2).
    a. Set up housing (2) in arbor press on two wood blocks.
    b. Using arbor press, press on gear (1).
    c. Let parts cool to room temperature.



25. REMOVE THREE SCREWS (4) AND WASHERS (3).

GO TO NEXT PAGE

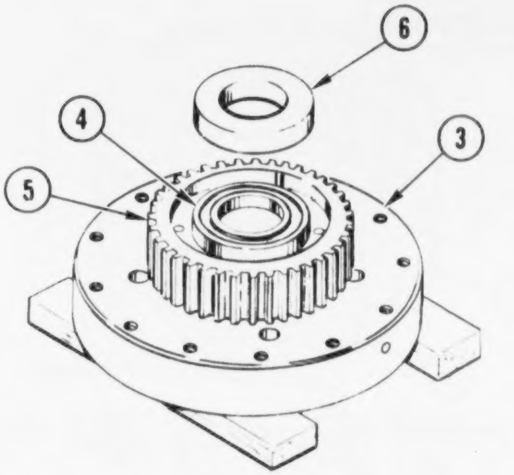


26. INSTALL SIX WASHERS (1) AND SCREWS (2).

   a. Coat threads of six screws (2) with sealant compound.

   b. Install six washers (1) and screws (2).

27. HELPER HOLD HOUSING (3). REPAIRER, USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (2) TO 20-25 ft-lb (3 mkg).

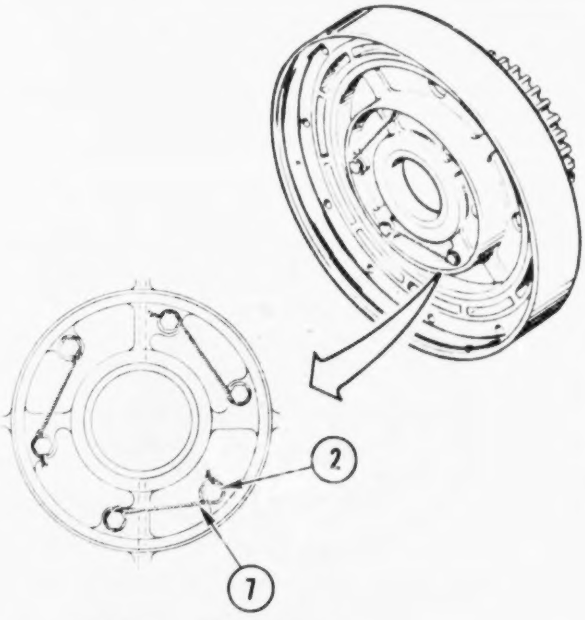


28. PRESS BEARING (4) INTO GEAR (5).

   a. Coat bearing (4) with transmission oil.

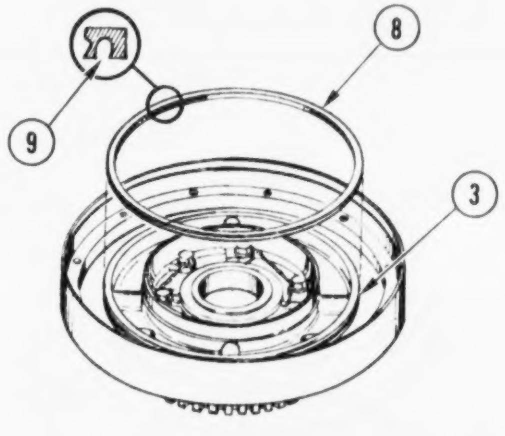
   b. Set up housing (3) in arbor press on two wood blocks.

   c. Using bearing installer (6) and arbor press, press in bearing (4).



29 INSTALL LOCKWIRE (7).

   a. Using wire-twister pliers, install lockwire (7) through three pairs of screws (2).

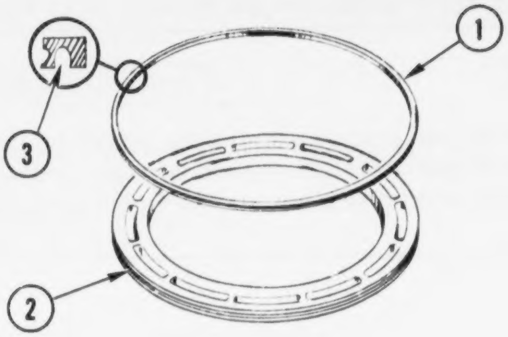


CAUTION

V-groove must face down. Damage to equipment can occur.

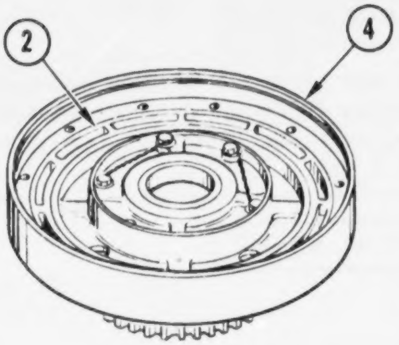
30. INSTALL NEW PREFORMED PACKING (8) IN HOUSING (3).

   a. Coat new packing (8) with transmission oil. Install packing in housing (3) with V-groove (9) down.



CAUTION
V-groove must face down. Damage to equipment can occur.

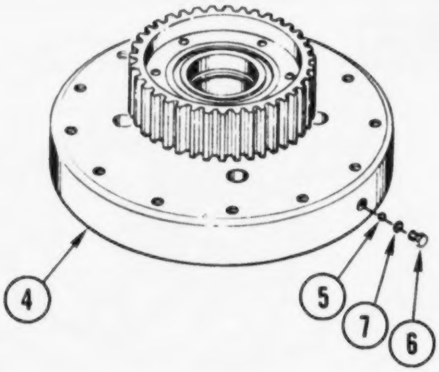
31. INSTALL NEW PREFORMED PACKING (1) ON PISTON (2).
    a. Coat new packing (1) with transmission oil. Install packing on piston (2) with V-groove (3) down.



32. SEAT PISTON (2) IN HOUSING (4).

33. INSTALL BALL (5) AND PLUG (6).
    a. Coat new preformed packing (7) with transmission oil.
    b. Install packing (7) on plug (6).
    c. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, install ball (5) and plug (6) in housing (4).

34. HELPER HOLD HOUSING (4). REPAIRER, USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (6) TO 50-60 in-lb (58-69 cmkg).



END OF TASK

REPAIR PISTON DISCONNECT CLUTCH HOUSING INSERTS

DESCRIPTION

This task gives the location and part number of helical coil inserts used in the piston housing assembly. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove and install helical coil inserts, refer to Replace Helical Coil Inserts. See page 2-166.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer depth gage — (Item 54, App C)
- Screw-thread insert kit — (Item 63, App C)
- Screw threading set — (Item 65, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)

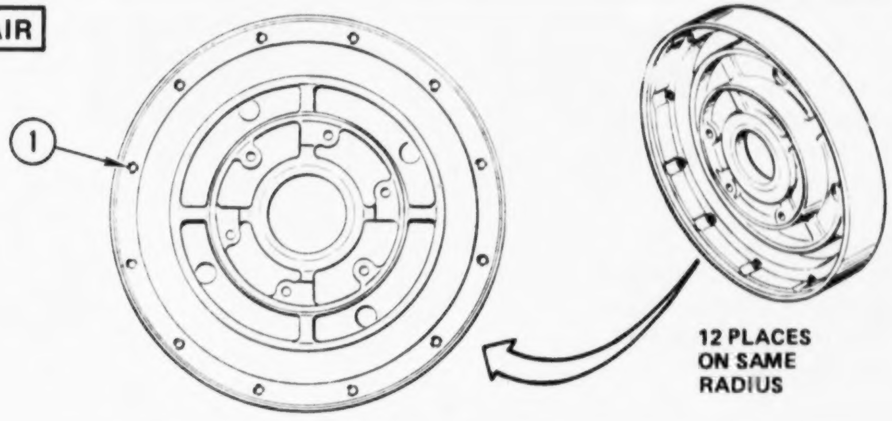
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Piston disconnect housing on workbench. See page 4-82.

REPAIR



HELICAL COIL INSERT REPLACEMENT INFORMATION

Index No.	Insert No.	Insert Thread Size (Inches)	Installation Depth Below Surface
1	MS21209 F6-20	3/8-24	0.24-0.26 in. (6.1-6.6 mm)

END OF TASK

REPAIR PISTON DISCONNECT CLUTCH HOUSING

DESCRIPTION

This task covers: Disassemble (page 4-91). Assemble (page 4-92).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Leather gloves — (Item 42, App C)
- Thermal drying oven — (Item 94, App C)

Materials/Parts:

- Dry ice — (Item 4, App B)
- Wood blocks (2) — (Item 3, App D)
- Bushing

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Piston disconnect clutch housing on workbench. See page 4-82.

DISASSEMBLE

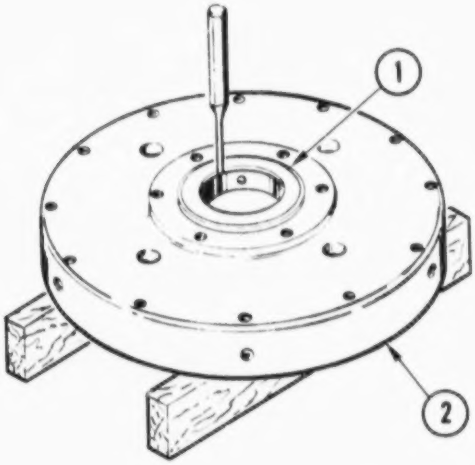
WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

CAUTION

Use care when removing bushing from housing. Damage to equipment can occur.

1. REMOVE BUSHING (1) FROM HOUSING (2).
   a. Using oven, heat housing (2) to 270° - 300° F (132° - 149° C).
   b. Using gloves, place housing (2) closed face up on two wood blocks.
   c. Using drive punch and hammer, remove and discard bushing (1).



2. CLEAN PISTON DISCONNECT CLUTCH HOUSING. See page 2-2.
3. INSPECT PISTON DISCONNECT CLUTCH HOUSING. See page 2-5.

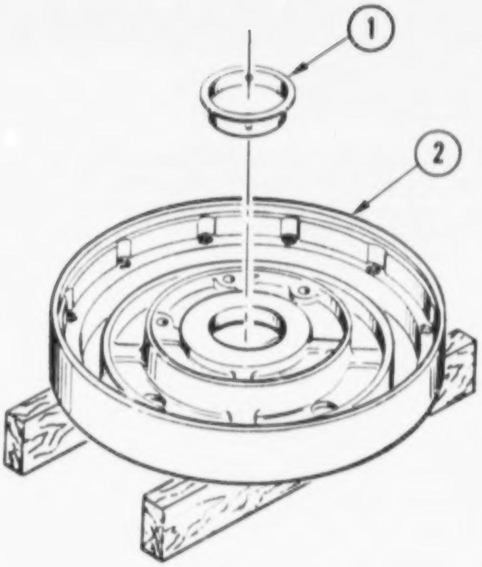
GO TO NEXT PAGE

ASSEMBLE

WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

4. INSTALL NEW BUSHING (1).
   - a. Using dry ice, cool new bushing (1) to approximately -110° F (-79° C).
   - b. Using oven, heat housing (2) to 270° - 300° F (132° - 149° C).
   - c. Using gloves, place housing (2) open face up on two wood blocks.
   - d. Using plastic-faced hammer, tap bushing (1) into housing (2).



END OF TASK

Section III. INPUT BEVEL ASSEMBLY

TASK INDEX

Task	Page
Replace Input Bevel Assembly	4-94
Replace Input Bevel Assembly Shaft Seals	4-122
Repair Input Bevel Assembly	4-126
Repair Input Bevel Housing Inserts	4-138

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information see page xv.

REPLACE INPUT BEVEL ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-94). Install (4-102).

INITIAL SETUP

Tools:

Angle bracket — (Item 2, App C)
Arbor press — (Item 3, App C)
Backlash actuator assembly — (Item 4, App C)
Bearing extractor — (Item 5, App C)
Bevel gear shimming fixture — (Item 16, App C)
C-clamp (2) — (Item 18, App C)
Crowfoot attachment — (Item 20, App C)
Dial indicator — (Item 23, App C)
Drag wrench — (Item 24, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Leather gloves — (Item 42, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper set — (Item 52, App C)
Micrometer depth gage — (Item 54, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench adapter — (Item 74, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench set — (Item 89, App C)
Thermal drying oven — (Item 94, App C)

Tools: (cont)

Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

Dry ice — (Item 4, App B)
Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)
Wood block (2) — (Item 6, App D)
Bevel gearshaft shim repair kit (2)
Input bevel repair kit
Socket head cap screw

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

TM 9-214

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
3. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
4. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

5. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

6. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

7. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

8. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

9. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

10. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

11. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

12. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

13. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

14. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

15. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

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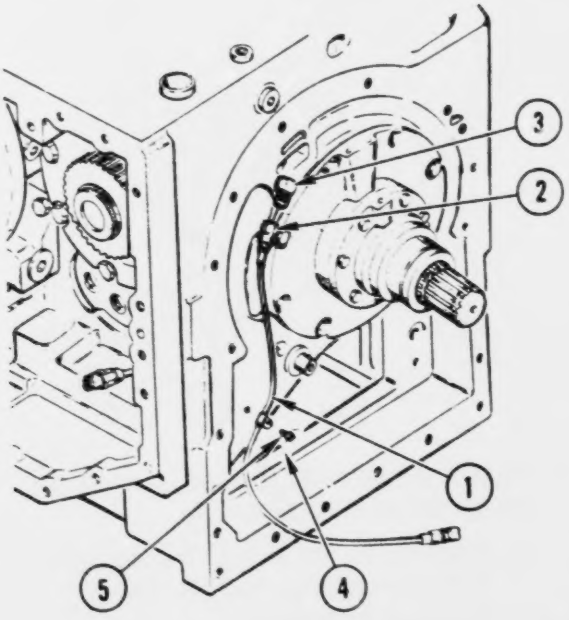
16. REMOVE HOSE ASSEMBLY (1).
    a. Disconnect nut (2) from hose to boss elbow (3).
    b. Using wire-twister pliers, remove and discard lockwire (4).
    c. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (5). Discard screw.
    d. Remove hose assembly (1).



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WARNING

Input bevel assembly is heavy and awkward. Remove slowly or input bevel assembly can fall and injure you.

NOTE

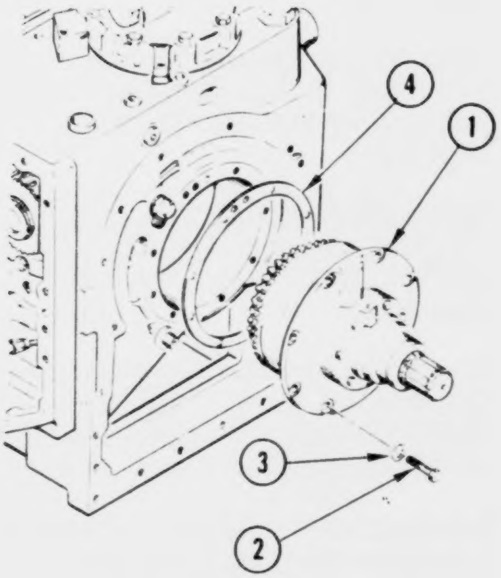
If input bevel does not come out, tap back in and pull straight out with a jerk.

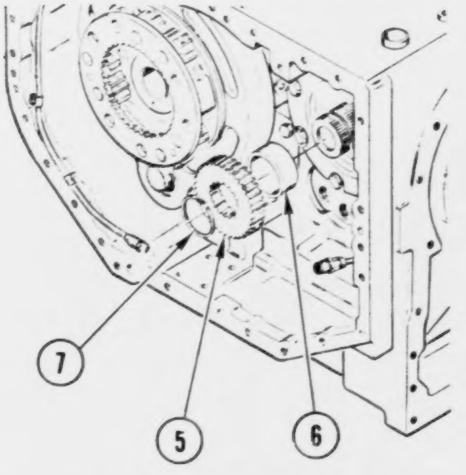
17. REMOVE INPUT BEVEL ASSEMBLY (1).

    a. Remove eight screws (2) and washers (3).

    b. Using both hands, grasp assembly (1) and pull straight out.

    c. Remove and discard bearing housing shim(s) (4).

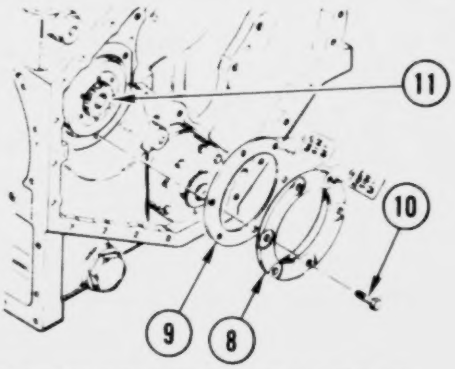




18. REMOVE SECOND RANGE SUN SPUR GEAR (5) AND SPACER (6).

    a. Working on left side of transmission, remove retaining ring (7). Use retaining ring pliers.

    b. Remove gear (5) and spacer (6).



19. REMOVE BEARING RETAINER (8) AND BEARING SHIM(S) (9).

    a. Working on right side of transmission, remove six bolts (10).

    b. Using plastic-faced hammer, tap spur gearshaft (11) from opposite side of transmission to loosen retainer (8).

    c. Remove retainer (8) and shim(s) (9).

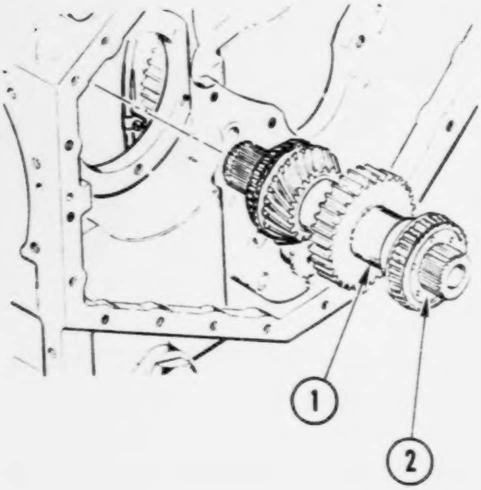
20. TAG RETAINER (8) AND SHIM(S) (9) AS "RIGHT SIDE SET".

WARNING

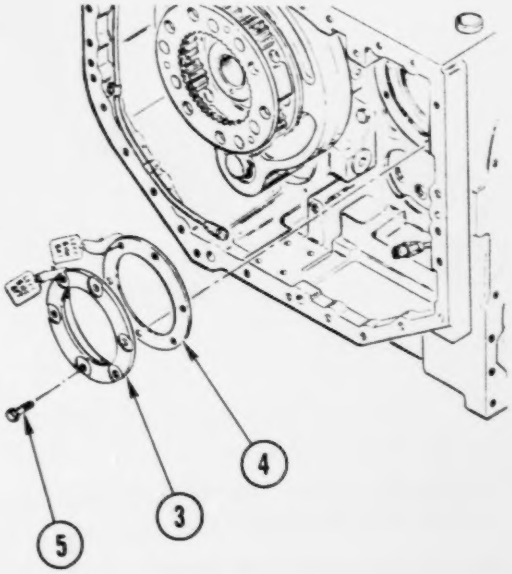
Gearshaft is heavy and awkward. Coupling could be loose. Remove carefully or gearshaft can fall and injure personnel.

CAUTION

Do not contact hose with gearshaft. Damage to equipment can occur.



21. REPAIRER AND HELPER REMOVE GEARSHAFT (1).
    a. Remove coupling (2) if loose on gearshaft (1).
    b. Remove gearshaft (1).



22. REMOVE BEARING RETAINER (3) AND BEARING SHIM(S) (4).
    a. Working on left side of transmission, remove six bolts (5).
    b. Remove retainer (3) and shim(s) (4).

23. TAG RETAINER (3) AND SHIM(S) (4) AS "LEFT SIDE SET".

24. INSPECT MAIN HOUSING INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

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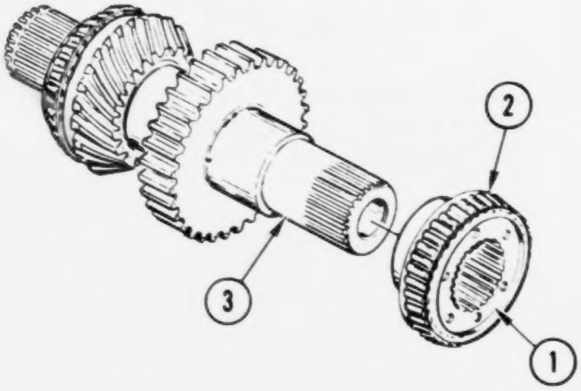
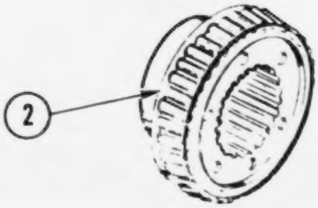
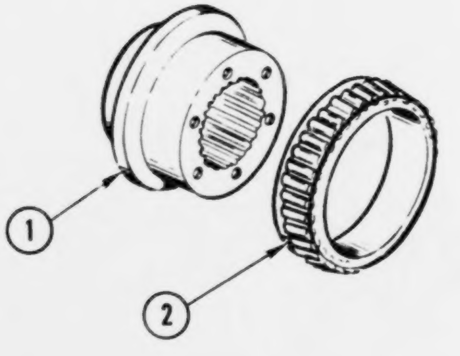


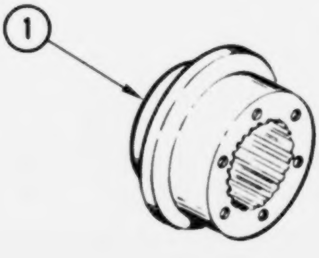
25. REMOVE SHAFT COUPLING (1) WITH CONE AND ROLLERS (2) FROM GEARSHAFT (3).



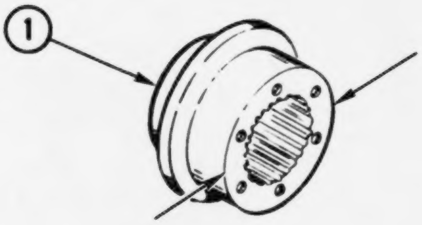
26. INSPECT CONE AND ROLLERS (2).
    a. Inspect cone and rollers (2) for damage. See TM 9-214.
    b. If cone and rollers (2) are damaged, go to step 27. If not, go to step 30.



27. REMOVE CONE AND ROLLERS (2) FROM COUPLING (1).
    a. Using mechanical puller kit, remove cone and rollers (2) from coupling (1). Replace cone and rollers.

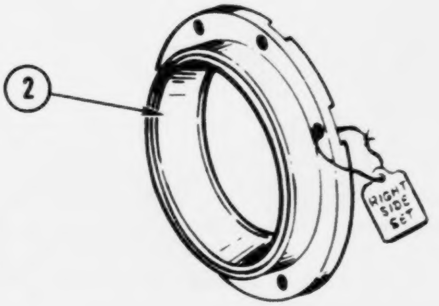


28. INSPECT COUPLING (1).
    a. Inspect coupling (1) for damage. See page 2-5.
    b. If coupling (1) is not damaged, go to step 29. If coupling is damaged, replace coupling and go to step 30.

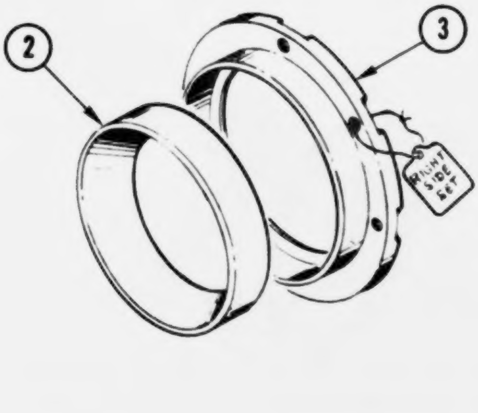


29. CHECK COUPLING (1).
    a. Using micrometer caliper set, measure outside diameter of coupling (1).
    b. Replace coupling (1) if measurement is less than 3.6265 inches (92.113 mm).

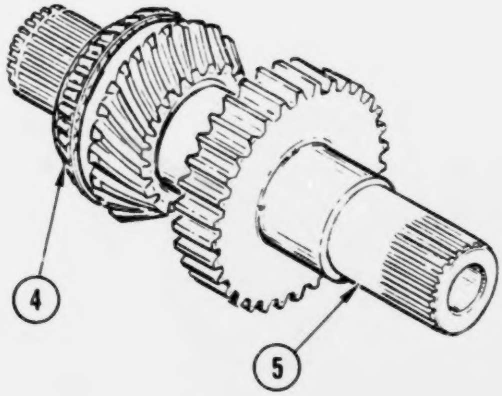
30. INSPECT SPUR GEARSHAFT COUPLING INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR SPUR GEARSHAFT COUPLING INSERTS, page 4-354.



31. INSPECT ROLLER CUP (2).
    a. Inspect cup (2) for damage. See TM 9-214.
    b. If cup (2) is damaged, go to step 32. If not, go to step 33.



32. REMOVE CUP (2) FROM RETAINER (3) TAGGED AS "RIGHT SIDE SET".
    a. Using arbor press and bearing extractor, remove cup (2) from retainer (3).
    b. Replace cup (2).



33. INSPECT BEARING CONE AND ROLLERS (4) ON GEARSHAFT (5).
    a. Inspect cone and rollers (4) for damage. See TM 9-214.
    b. If cone and rollers (4) are damaged, go to step 34. If not, go to step 38.

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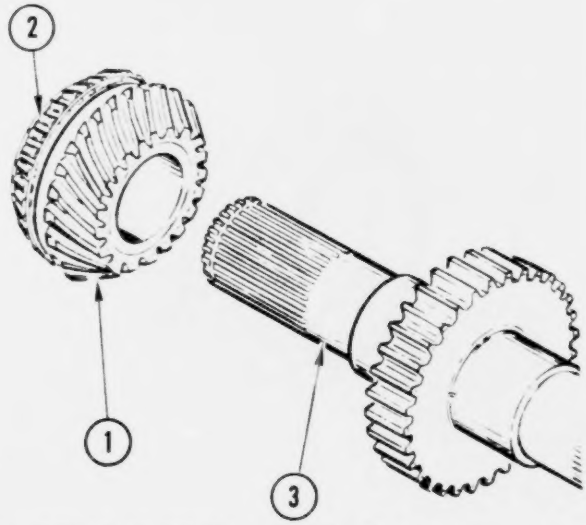
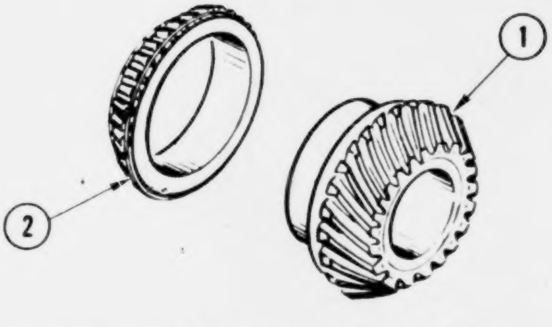


34. REMOVE SPIRAL BEVEL PINION (1) WITH CONE AND ROLLERS (2) FROM GEARSHAFT (3).

    a. Using mechanical puller kit, remove pinion (1) with cone and rollers (2) from gearshaft (3).



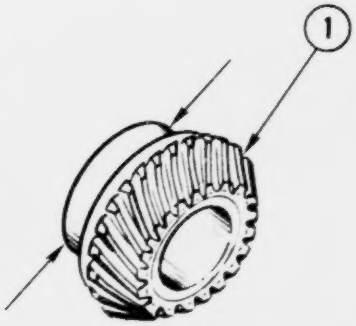
35. REMOVE CONE AND ROLLERS (2) FROM PINION (1).

    a. Using mechanical puller kit, remove cone and rollers (2) from pinion (1). Discard cone and rollers.

36. INSPECT PINION (1).

    a. Inspect pinion (1) for damage. See page 2-5.

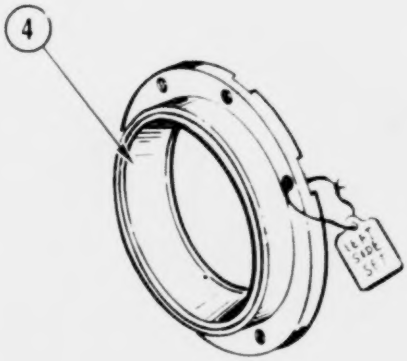
    b. If pinion (1) is not damaged, go to step 37. If pinion is damaged, replace pinion and cone and rollers (2). Go to step 38.



37. CHECK PINION (1).

    a. Using micrometer caliper set, measure outside diameter of pinion (1).

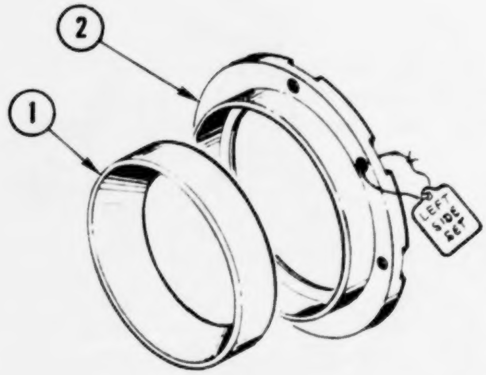
    b. Replace pinion (1) if measurement is less than 3.6265 inches (92.113 mm).



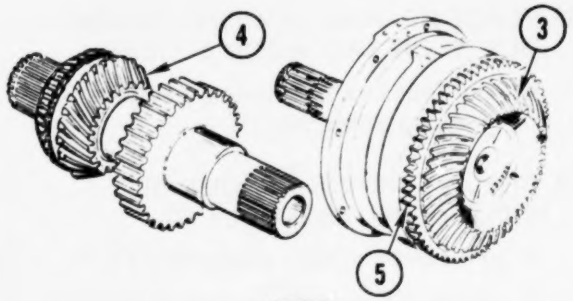
38. INSPECT ROLLER CUP (4).

    a. Inspect cup (4) for damage. See TM 9-214.

    b. If cup (4) is damaged, go to step 39. If not, go to step 40.



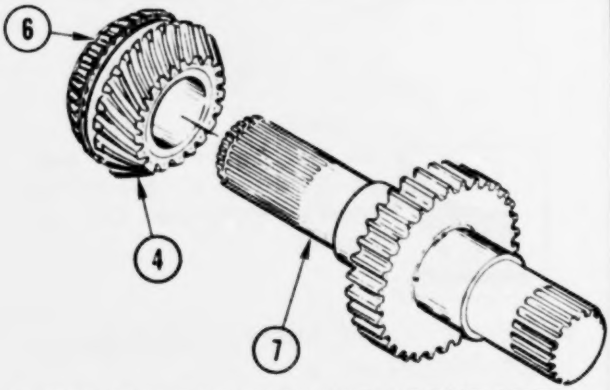
39. REMOVE CUP (1) FROM RETAINER (2) TAGGED AS "LEFT SIDE SET".
    a. Using arbor press and bearing extractor, remove cup (1) from retainer (2).
    b. Replace cup (1).



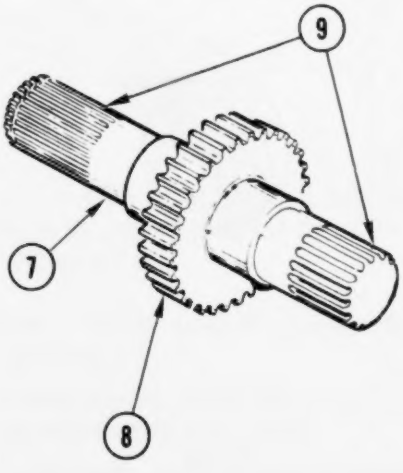
NOTE

If bevel gear or pinion is damaged, both gears must be replaced as a matched set.

40. INSPECT BEVEL GEAR (3), PINION (4), AND SPUR GEAR (5).
    a. Inspect gear (3), pinion (4) and gear (5) for excessive wear or damage. See page 2-5.
    b. If gear (3) or pinion (4) is worn or damaged, go to step 41.
    c. If gear (5) is worn or damaged, go to step 45.
    d. If pinion (4), and gears (3) and (5) are not damaged, save pinion and gears for installation. Go to step 43.



41. REMOVE PINION (4) WITH CONE AND ROLLERS (6) FROM GEARSHAFT (7) IF NOT REMOVED.
    a. Using mechanical puller kit, remove pinion (4) with cone and rollers (6) from gearshaft (7).
    b. Replace pinion (4) and cone and rollers (6).
    c. Discard old pinion (4) and cone and rollers (6).



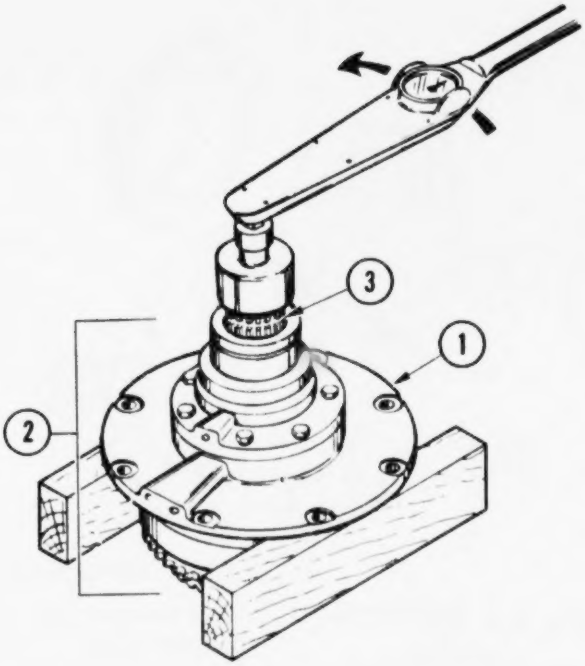
42. INSPECT GEARSHAFT TEETH (8) AND SPLINES (9).
    a. Inspect teeth (8) and splines (9) for damage. See page 2-5.
    b. Replace gearshaft (7) if damaged.

GO TO NEXT PAGE

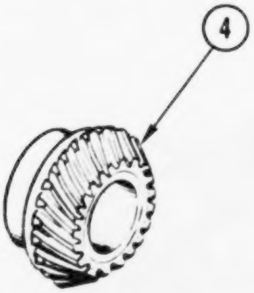
43. PLACE BEARING HOUSING ASSEMBLY (1) ON TWO WOOD BLOCKS.
    a. Put blocks under outside edge of housing assembly (1).

44. CHECK TURNING TORQUE OF INPUT BEVEL ASSEMBLY (2).
    a. (H) Hold housing assembly (1).
    b. Using 3/8-inch drive torque wrench with adapter and drag wrench, slowly and smoothly turn input gearshaft (3) completely around and measure turning torque.
    c. If turning torque is not 15-20 in-lb (17-23 cmkg), go to step 45. If turning torque is 15-20 in-lb (17-23 cmkg), go to step 46.

45. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.



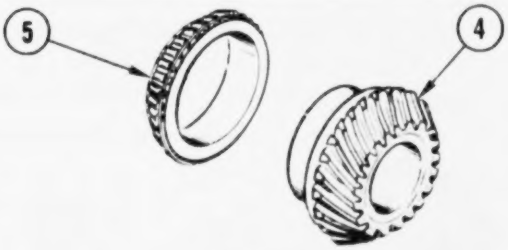
INSTALL



NOTE

Bevel gear and pinion are a matched set and must be replaced together. Serial numbers of gear set must match.

46. INSTALL PINION (4).
    a. If pinion (4) was removed, go to step 47. If not, go to step 48.



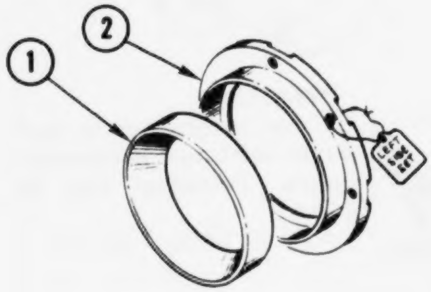
WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

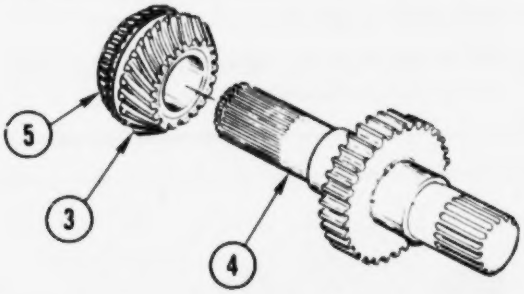
47. INSTALL CONE AND ROLLERS (5) ON PINION (4).
    a. Using dry ice, cool pinion (4) for approximately two hours.
    b. Using oven, heat cone and rollers (5) to 270°-300° F (132°-149° C).
    c. Wearing gloves, slide cone and rollers (5), wide end first, onto pinion (4), fully seating cone and rollers against pinion shoulder.
    d. Let parts return to room temperature.

WARNING

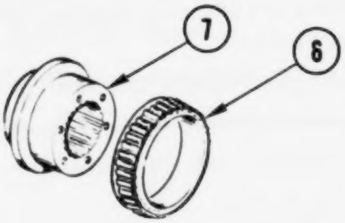
Do not handle hot or cold parts without protective gloves. Personnel can be injured.



48. INSTALL CUP (1) IN RETAINER (2), IF REMOVED.
    a. Using dry ice, cool cup (1) for approximately two hours.
    b. Using oven, heat retainer (2) to 270°-300° F (132°-149° C).
    c. Wearing gloves, slide cup (1), smaller diameter opening first, into retainer (2) fully seating cup against retainer shoulder.
    d. Let parts return to room temperature.



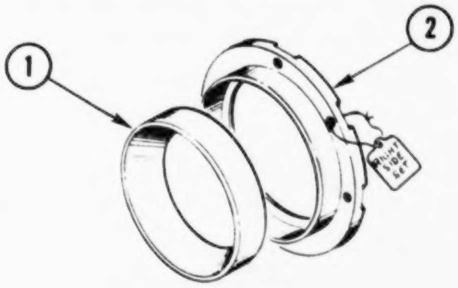
49. INSTALL PINION (3) ON GEARSHAFT (4).
    a. Using dry ice, cool gearshaft (4) for approximately two hours.
    b. Using oven, heat pinion (3) with cone and rollers (5) to 270°-300° F (132°-149° C).
    c. Wearing gloves, slide pinion (3), gear end first, onto gearshaft (4), fully seating pinion against gearshaft shoulder.
    d. Let parts return to room temperature.



50. IF CONE AND ROLLERS (6) WERE REMOVED, GO TO STEP 51. IF NOT, GO TO STEP 52.

51. INSTALL CONE AND ROLLERS (6) ON COUPLING (7).
    a. Using dry ice, cool coupling (7) for approximately two hours.
    b. Using oven, heat cone and rollers (6) to 270°-300° F (132°-149° C).
    c. Wearing gloves, slide cone and rollers (6) wide end first, onto coupling (7), fully seating cone against coupling shoulder.
    d. Let parts return to room temperature.

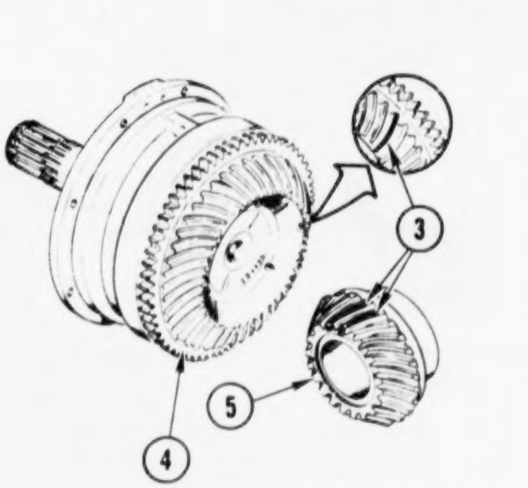
GO TO NEXT PAGE



WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

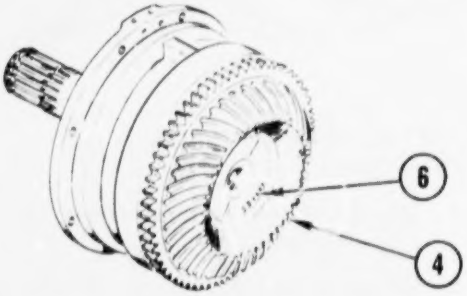
52. INSTALL CUP (1) IN RETAINER (2), IF REMOVED.
    - a. Using dry ice, cool cup (1) for approximately two hours.
    - b. Using oven, heat retainer (2) to 270°-300°F (132°-149°C).
    - c. Wearing gloves, slide cup (1), smaller diameter opening first, into retainer (2) fully seating cup against retainer shoulder.
    - d. Let parts return to room temperature.



CAUTION

Only top surface of gears must be painted. Paint on side surface of teeth where they mesh can cause damage to equipment.

53. PAINT TEETH (3) ON BEVEL GEAR (4) AND PINION (5), IF NOT ALREADY PAINTED.
    - a. Paint top of tooth (3) stamped with X on bevel gear (4).
    - b. Paint tops of two teeth (3) marked with X on pinion (5).



NOTE

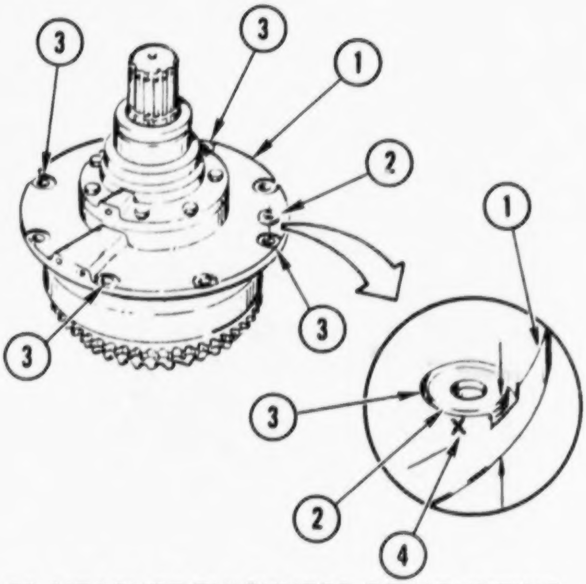
Actual setting distance is stamped on gear end of bevel gear. Stamped number reads S.D.X.XXX.

54. OBTAIN DIMENSION A.
    - a. Record setting distance (6) stamped on bevel gear (4).
    - b. Subtract 1.720 inches (43.7 mm) from setting distance (6).
    - c. Record result as dimension A.

SETTING DISTANCE ______ **INCH**

−1.720 **INCH**

STEP 54 DIMENSION A = ______ **INCH**



55. MEASURE THICKNESS OF MOUNTING FLANGE (1) AND WASHERS (2).

   a. Place two washers (2) from step 17 on spot face (3).

   b. Using micrometer caliper set, measure thickness of flange (1) and two washers (2) together in four places.

   c. Put temporary mark (4) on flange (1) at four spot faces (3).

   d. Retain washers (2).

			______ INCH
STEP 55	THICKNESSES		______ INCH
			______ INCH
		+	______ INCH
STEP 56a		=	______ INCH
STEP 56b		÷	4 INCH
STEP 56c	DIMENSION B	=	______ INCH

56. OBTAIN DIMENSION B.

   a. Add four thicknesses.

   b. Divide result of step 56a by four.

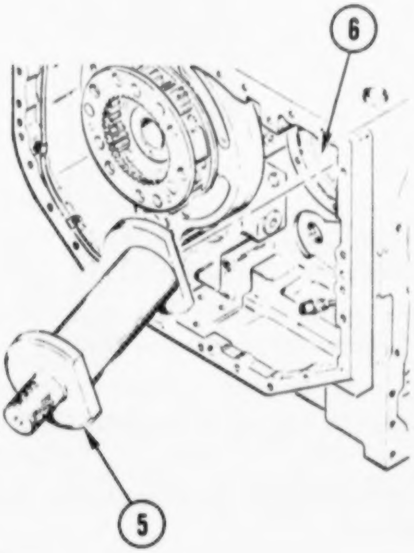
   c. Record result as dimension B.

NOTE

Fixture cannot be placed straight into housing. It must be tilted at an angle so that flange end of fixture fits through slot in gear shaft housing hole. Fixture is exact fitting and can easily stick.

57. INSTALL BEVEL GEAR SHIMMING FIXTURE (5) THROUGH LEFT SIDE OF TRANSMISSION (6).

   a. Seat fixture (5) in transmission (6).



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WARNING

Input bevel assembly is heavy and awkward. Install slowly or input bevel assembly can fall and injure personnel.

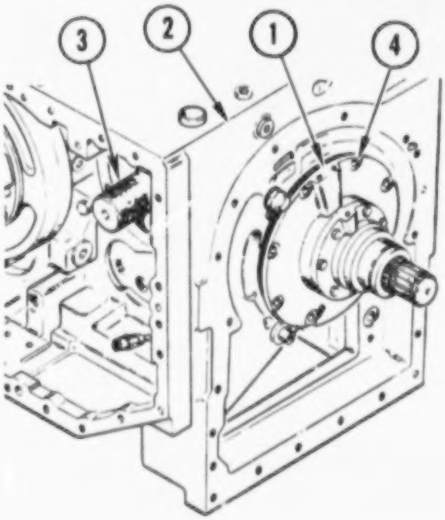
CAUTION

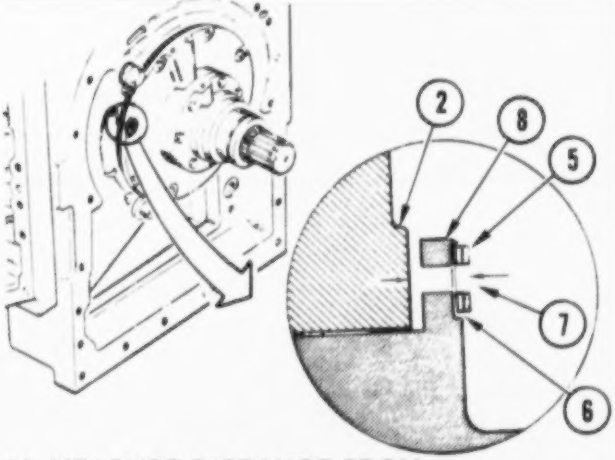
Use care when pushing input bevel assembly into transmission housing. Equipment can be damaged.

NOTE

It is necessary to look through bottom of transmission to see gear touch fixture.

58. POSITION INPUT BEVEL ASSEMBLY (1) INTO HOUSING (2).
    a. Coat outside of assembly (1) with transmission oil.
    b. Using plastic-faced hammer, tap assembly (1) into housing (2) until contact with fixture (3) is made.
    c. Do not allow screw holes (4) to aline with holes in housing (2).





59. MEASURE DISTANCE FROM WASHERS (5) TO HOUSING (2).
    a. Place same two washers (5) on same spot faces (6) marked in step 55.
    b. Using depth gage, measure distance from washers (5) to housing (2) through screw hole (7) of mounting flange (8).
    c. Repeat step 59b for three other spot faces (6).

STEP 59	DISTANCES	_____ INCH
		_____ INCH
		_____ INCH
		+ _____ INCH
STEP 60a		= _____ INCH
STEP 60b		÷ 4 INCH
STEP 60c	DIMENSION C	= _____ INCH

60. OBTAIN DIMENSION C.
    a. Add four distances.
    b. Divide result of step 60a by four.
    c. Record result as dimension C.

STEP 60	DIMENSION C		_____ INCH
STEP 56	DIMENSION B	−	_____ INCH
STEP 61	DIMENSION D	=	_____ INCH

61. OBTAIN DIMENSION D.

a. Subtract dimension B from dimension C.

b. Record result as dimension D.

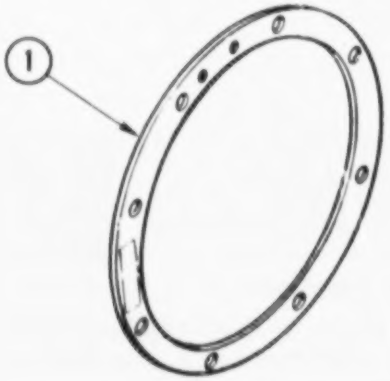
STEP 61	DIMENSION D		_____ INCH
		−	0.003 INCH
STEP 62a		=	_____ INCH
STEP 54	DIMENSION A	+	_____ INCH
STEP 62	DIMENSION E	=	_____ INCH

62. OBTAIN DIMENSION E.

a. Subtract 0.003 inch (0.08 mm) from dimension D.

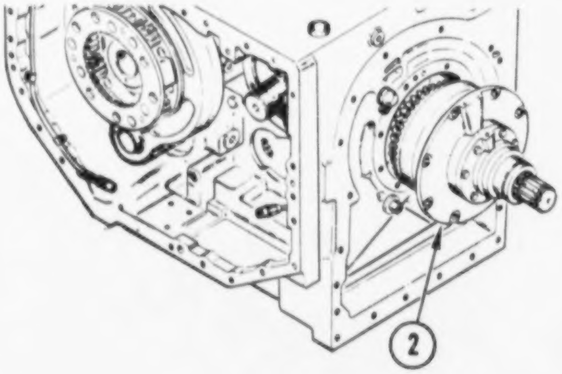
b. Add dimension A to results of 62a.

c. Record result as dimension E.



63. SELECT NEW BEARING HOUSING SHIM(S) (1) FROM INPUT BEVEL REPAIR KIT.

a. Select shim(s) (1) from input bevel repair kit that is equal to dimension E.



WARNING

Do not drop input bevel assembly. Personnel can be injured.

64. REMOVE INPUT BEVEL ASSEMBLY (2).

a. Using both hands, grasp assembly (2) and pull straight out.

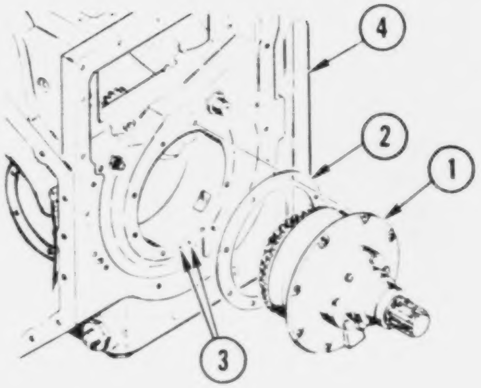
GO TO NEXT PAGE

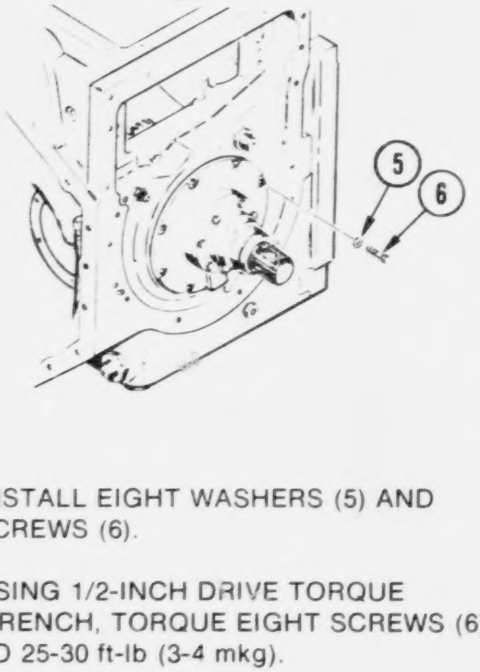
NOTE

Input bevel repair kit contains shims of several thicknesses for making bearing housing shim. Nicks and burrs must be removed from shim(s) before use.

65. ROTATE TRANSMISSION SO BOTTOM SIDE IS UP.

66. INSTALL INPUT BEVEL ASSEMBLY (1) WITH NEW SHIM(S) (2) AS DETERMINED IN STEP 63.
    a. Slide shim(s) (2) onto assembly (1) and aline screw holes and oil holes (3). Shim(s) go on one way.
    b. Coat assembly (1) with transmission oil.
    c. Push assembly (1) into housing (4) until all holes are alined.



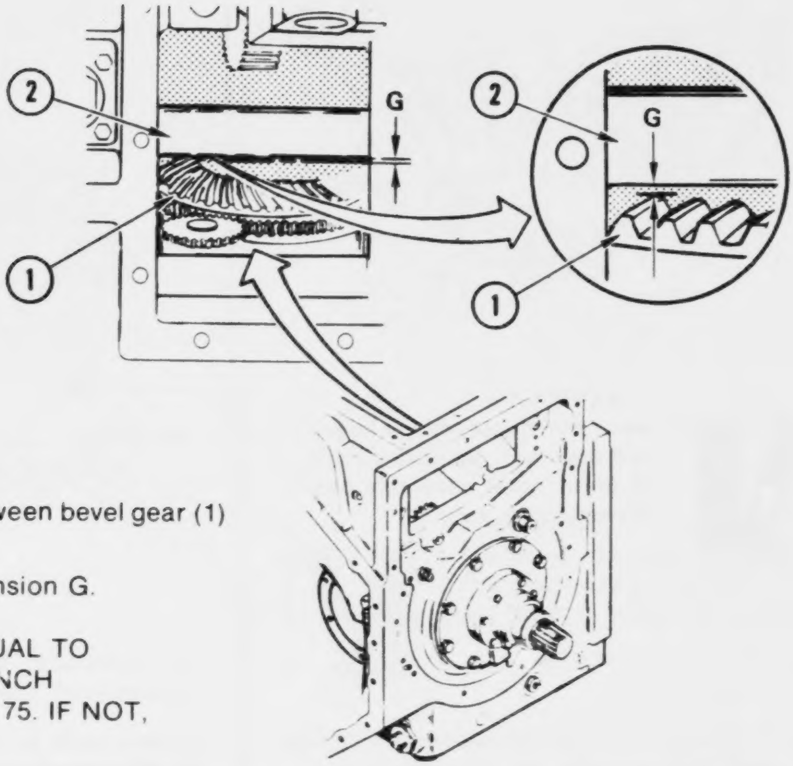


67. INSTALL EIGHT WASHERS (5) AND SCREWS (6).

68. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE EIGHT SCREWS (6) TO 25-30 ft-lb (3-4 mkg).

STEP 54	DIMENSION A	______	INCH
STEP 69a		–0.003	INCH
STEP 69	DIMENSION F	= ______	INCH

69. OBTAIN DIMENSION F.
    a. Subtract 0.003 inch (.08 mm) from dimension A.
    b. Record result as dimension F.

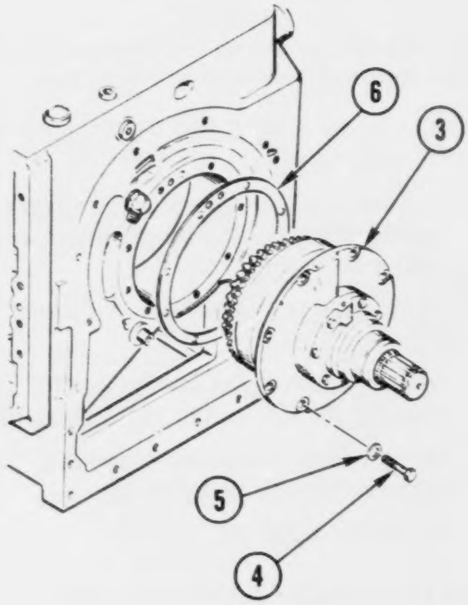


70. OBTAIN DIMENSION G.
    a. Measure distance between bevel gear (1) and fixture (2).
    b. This distance is dimension G.

71. IF DIMENSION G IS EQUAL TO DIMENSION F ± 0.001 INCH (0.03 mm), GO TO STEP 75. IF NOT, GO TO STEP 72.

WARNING

Input bevel assembly is heavy and awkward. Remove slowly or input bevel assembly can fall and injure you.



72. ROTATE TRANSMISSION SO TOP SIDE IS UP.

73. REMOVE INPUT BEVEL ASSEMBLY (3).
    a. Remove eight screws (4) and washers (5).
    b. Using both hands, grasp assembly (3) and pull straight out.
    c. Remove shim(s) (6).

74. GO TO STEP 54.

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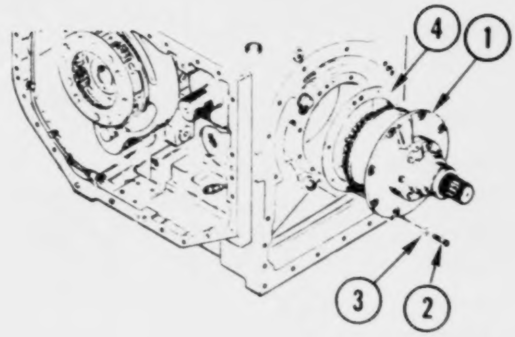


WARNING

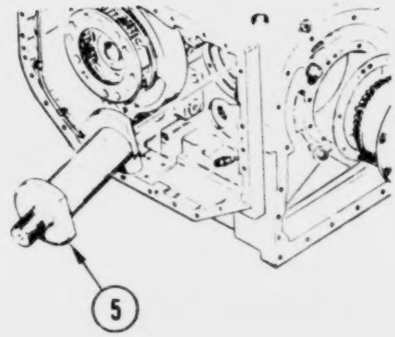
Input bevel assembly is heavy and awkward. Remove slowly or input bevel assembly can fall and injure you.

75. REMOVE INPUT BEVEL ASSEMBLY (1).

    a. Remove eight screws (2) and washers (3).

    b. Using both hands, grasp assembly (1) and pull straight out.

    c. Remove and save shim(s) (4) for step 84.



NOTE

Fixture must be pulled part way out and tilted to remove. Fixture is exact fit and can easily stick.

76. REMOVE FIXTURE (5).

NOTE

Shim(s) will only go on one way. Nicks and burrs must be removed from shim(s) before use.

77. INSTALL LEFT SIDE SET RETAINER (6) AND SHIM(S) (7).

    a. If shim(s) (7) were lost or damaged during removal, start installation with .050 inch shim(s).

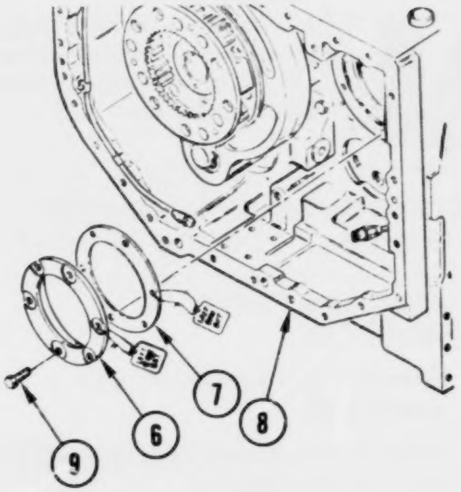
    b. Remove tags from retainer (6) and shim(s) (7).

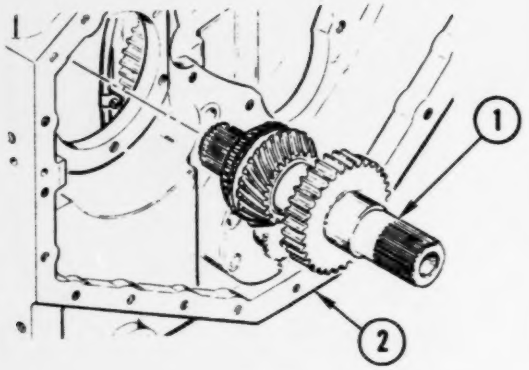
    c. Aline six bolt holes in retainer (6) and shim(s) (7) with holes in housing (8).

    d. Using plastic-faced hammer, tap retainer (6) into housing (8).

    e. Install six bolts (9).

78. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (9) TO 25-30 ft-lb (3-4 mkg).





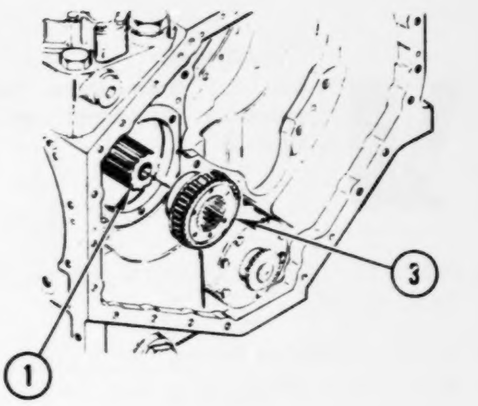
WARNING

Do not drop gearshaft. Personnel can be injured.

CAUTION

Use care when installing gearshaft or damage to hose assembly and hose clamp can result.

79. INSTALL GEARSHAFT (1) IN RIGHT SIDE OF HOUSING (2).



WARNING

Coupling can fall off shaft. Personnel can be injured.

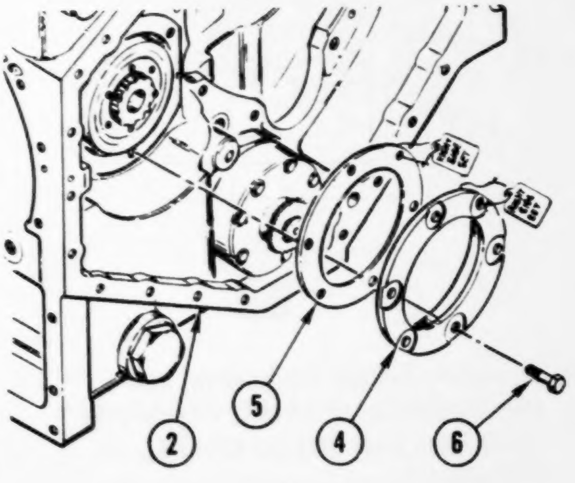
80. COAT INSIDE OF COUPLING (3) WITH TRANSMISSION OIL. INSTALL COUPLING ON GEARSHAFT (1).

NOTE

Shim(s) will only go on one way. Nicks and burrs must be removed from shim(s) before use.

81. INSTALL RIGHT SIDE SET RETAINER (4) AND SHIM(S) (5).
    a. If shim(s) (5) were lost or damaged during removal, start installation with .065 inch shim(s).
    b. Remove tags from retainer (4) and shim(s) (5).
    c. Aline six bolt holes in retainer (4) and shim(s) (5) with holes in housing (2).
    d. Using plastic-faced hammer, tap retainer (4) into housing (2).
    e. Install six bolts (6).

82. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (6) TO 25-30 ft-lb (3-4 mkg).



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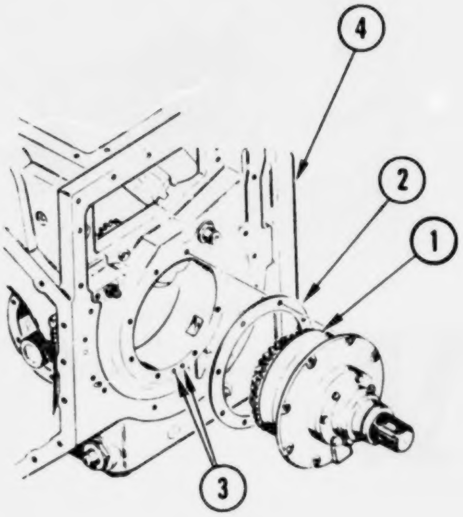
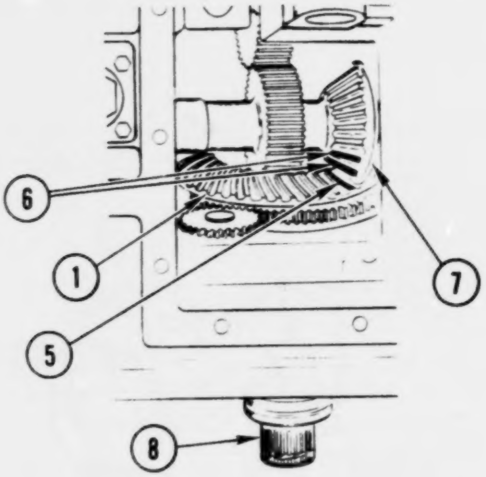
WARNING

Do not drop input bevel assembly. Personnel can be injured.

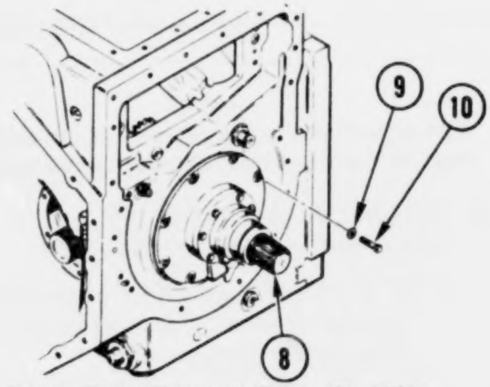
83. ROTATE TRANSMISSION SO BOTTOM SIDE IS UP.

84. INSTALL INPUT BEVEL ASSEMBLY (1) WITH NEW SHIM(S) (2) REMOVED IN STEP 75.
    a. Slide shim(s) (2) onto assembly (1) and aline screw holes and oil holes (3). Shim(s) go on one way.
    b. Coat assembly (1) with transmission oil.
    c. Push assembly (1) into housing (4) until all holes are alined.





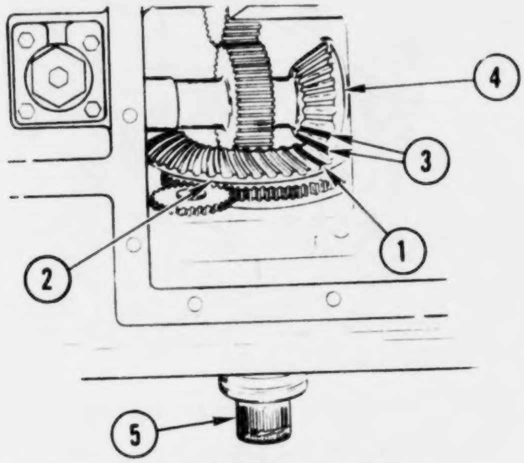
85. ALINE PAINTED TOOTH (5) ON INPUT BEVEL ASSEMBLY (1) WITH TWO PAINTED TEETH (6) ON PINION (7).
    a. Looking into bottom of transmission, rotate input shaft (8) until tooth (5) is between two teeth (6).



86. INSTALL EIGHT WASHERS (9) AND SCREWS (10).

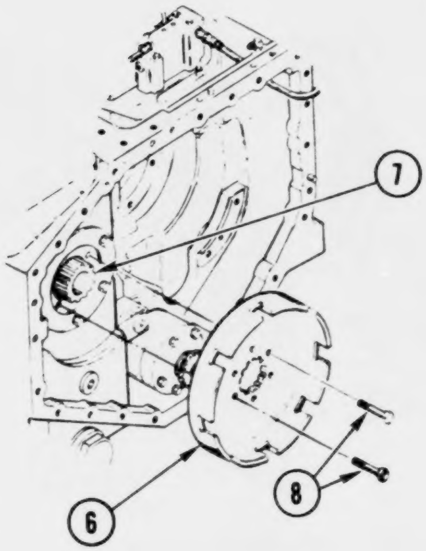
87. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE EIGHT SCREWS (10) TO 25-30 ft-lb (3-4 mkg).

88. ROTATE INPUT GEARSHAFT (8) TO SEAT BEARINGS.
    a. Rotate input gearshaft (8) an equal number of turns right, then left, to seat bearings.

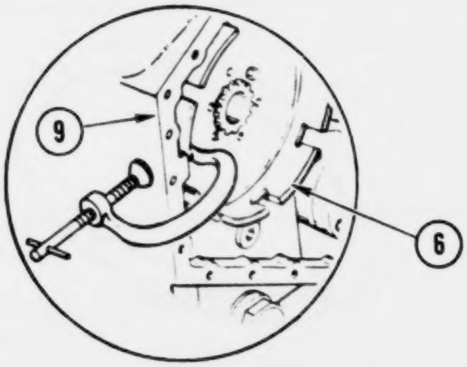


89. ALINE PAINTED TOOTH (1) ON INPUT BEVEL ASSEMBLY (2) WITH TWO PAINTED TEETH (3) ON PINION (4).
   a. Looking into bottom of transmission, rotate input shaft (5) until tooth (1) is between two teeth (3).

90. ROTATE TRANSMISSION SO TOP SIDE IS UP.



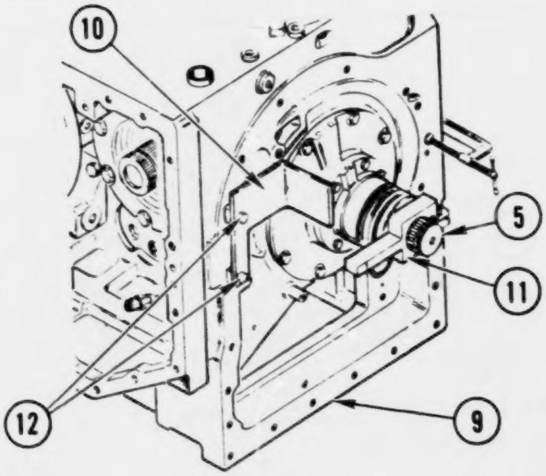
91. INSTALL THIRD RANGE CLUTCH HOUSING (6).
   a. Working on right side of transmission, position and hold housing (6) on gearshaft (7).
   b. Install two screws (8).



CAUTION

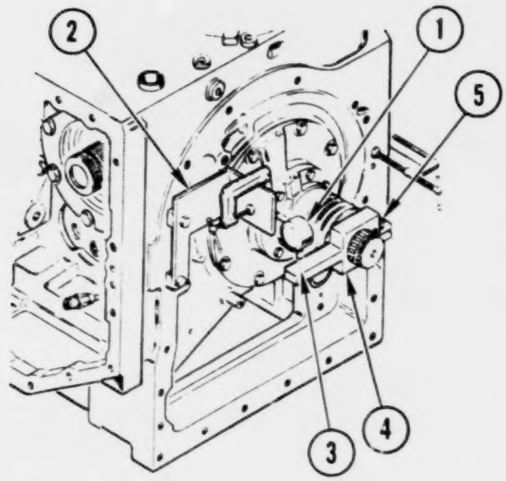
Do not use excessive force when tightening clamp. Damage to equipment can occur.

92. LOCK CLUTCH HOUSING (6) TO TRANSMISSION HOUSING (9).
   a. Working on right side of transmission, lock clutch housing (6) to transmission housing (9). Use C-clamp.
   b. Tighten clamp only enough to prevent clutch housing (6) from rotating.

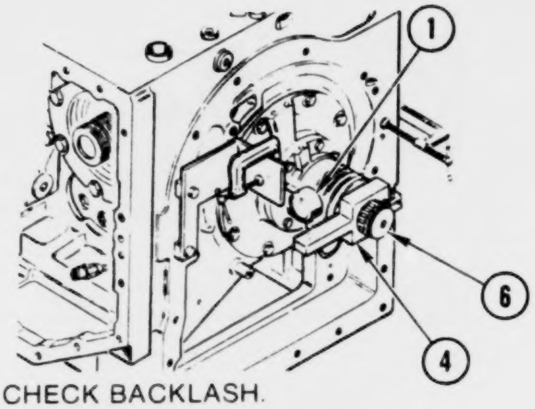


93. ATTACH ANGLE BRACKET (10) AND BACKLASH ACTUATOR (11).
   a. Fasten bracket (10) to housing (9) using two Power Takeoff Assembly mounting screws (12).
   b. Position actuator (11) on input gearshaft (5).

GO TO NEXT PAGE



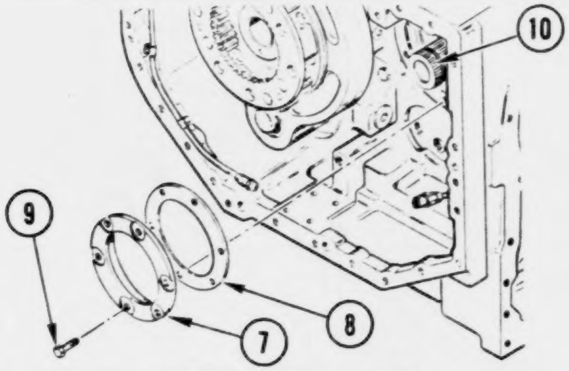
94. INSTALL DIAL INDICATOR (1).
    a. Position dial indicator (1) on bracket (2) with C-clamp.
    b. Aline dial indicator (1) with actuator indicator line (3) on actuator (4).
    c. Turn actuator (4) to actuate indicator (1).
    d. Tighten actuator screw (5).



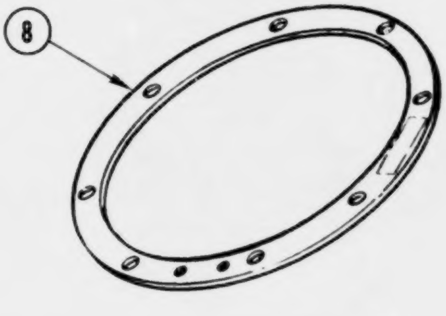
95. CHECK BACKLASH.
    a. Turn input gearshaft (6) left.
    b. Zero dial indicator (1).
    c. Turn gearshaft (6) right, by hand, enough to read backlash on indicator (1).

96. REMOVE TWO C-CLAMPS, DIAL INDICATOR (1), AND ACTUATOR (4).

97. IF BACKLASH IS NOT 0.008-0.011 INCH (0.20-0.28 mm), GO TO STEP 98. IF BACKLASH IS 0.008-0.011 INCH (0.20-0.28 mm), GO TO STEP 114.



98. REMOVE RETAINER (7) AND SHIM(S) (8).
    a. Working on left side of transmission, remove six bolts (9).
    b. Using plastic-faced hammer, tap spur gearshaft (10) from opposite side of transmission to loosen retainer (7).
    c. Using pry bar behind shim(s) (8), carefully remove retainer (7) and shim(s).

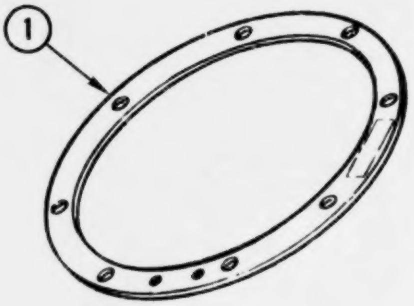


NOTE

Thickness of each shim is marked on face of shim.

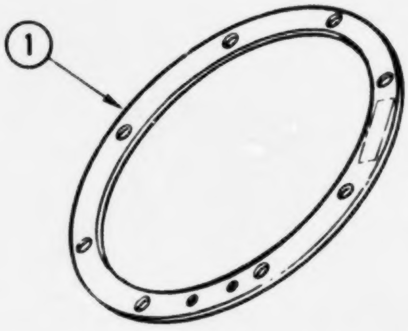
99. FIND TOTAL THICKNESS OF ALL SHIM(S) (8).

100. IF BACKLASH IS GREATER THAN 0.011 inch (0.28 mm), GO TO STEP 101. IF BACKLASH IS LESS THAN 0.008 INCH (0.20 mm), GO TO STEP 102.



STEP 99 0.____ INCH
−0.005 INCH
STEP 101 0.____ INCH

101. REPLACE SHIM(S) (1) WITH SET THAT IS 0.005 INCH (0.13 mm) THINNER. GO TO STEP 103.



STEP 99 0.____ INCH
+0.005 INCH
STEP 102 0.____ INCH

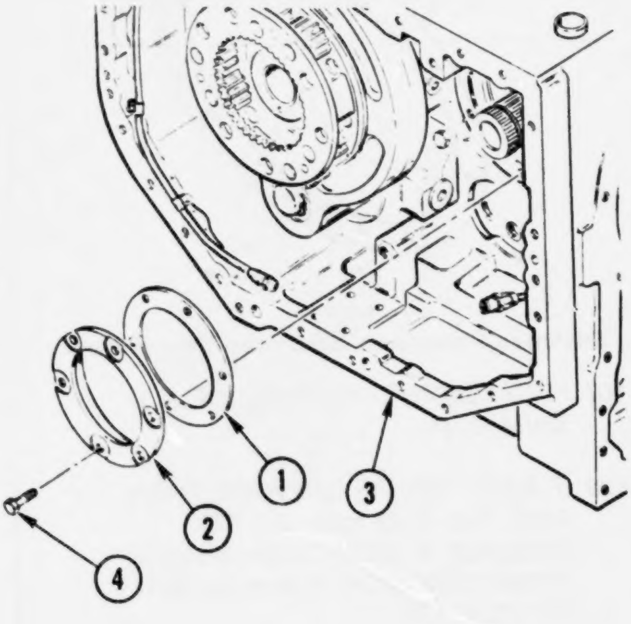
102. REPLACE SHIM(S) (1) WITH SET THAT IS 0.005 INCH (0.13 mm) THICKER.

NOTE

Nicks and burrs must be removed from shim(s) before use.

103. INSTALL RETAINER (2) AND SHIM(S) (1).
    a. Slide shim(s) (1) onto retainer (2) and press retainer into housing (3).
    b. Aline six bolt holes in retainer (2) and shim(s) (1) with housing (3). Using plastic-faced hammer, tap retainer (2) into place.
    c. Install six bolts (4).

104. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (4) TO 25-30 ft-lb (3-4 mkg).



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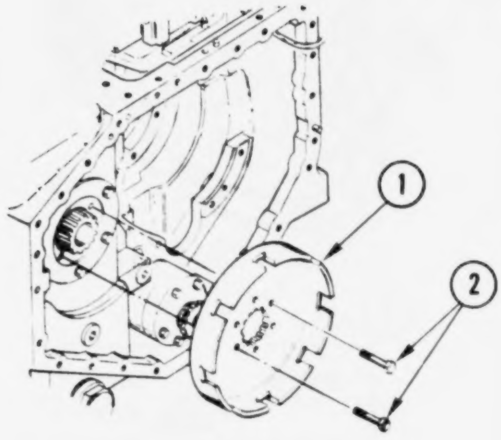
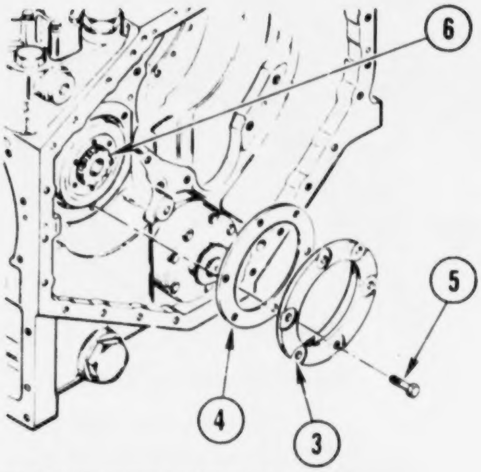
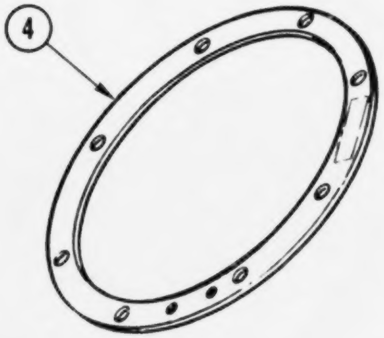


105. REMOVE CLUTCH HOUSING (1).
   a. Working on right side of transmission, remove two screws (2) and clutch housing (1).



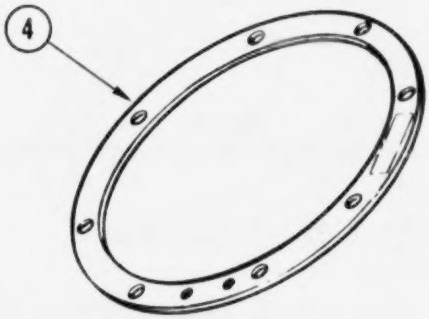
106. REMOVE RETAINER (3) AND SHIM(S) (4).
   a. Remove six bolts (5).
   b. Using plastic-faced hammer, tap spur gearshaft (6) from opposite side of transmission to loosen retainer (3).
   c. Using pry bar behind shims (4), carefully remove retainer (3) and shim(s).



NOTE
Thickness of each shim is marked on face of shim.

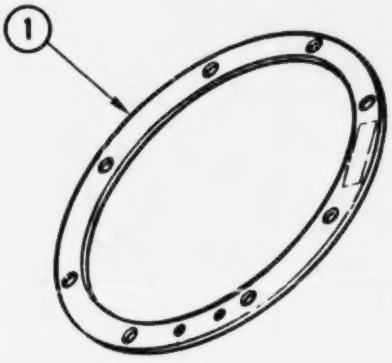
107. FIND TOTAL THICKNESS OF ALL SHIM(S) (4).

108. IF BACKLASH IS GREATER THAN 0.011 inch (0.28 mm), GO TO STEP 109. IF BACKLASH IS LESS THAN 0.008 INCH (0.20 mm), GO TO STEP 110.



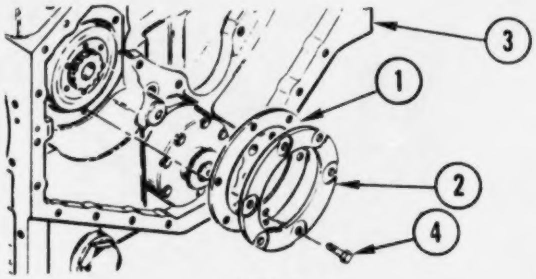
STEP 107	**0.____**	**INCH**
	+0.005	**INCH**
STEP 109	**0.____**	**INCH**

109. REPLACE SHIM(S) (4) WITH SET THAT IS 0.005 INCH (0.13 mm) THICKER. GO TO STEP 111.



STEP 107 0.____ INCH
−0.005 INCH
STEP 108 0.____ INCH

110. REPLACE SHIM(S) (1) WITH SET THAT IS 0.005 INCH (0.13 mm) THINNER.



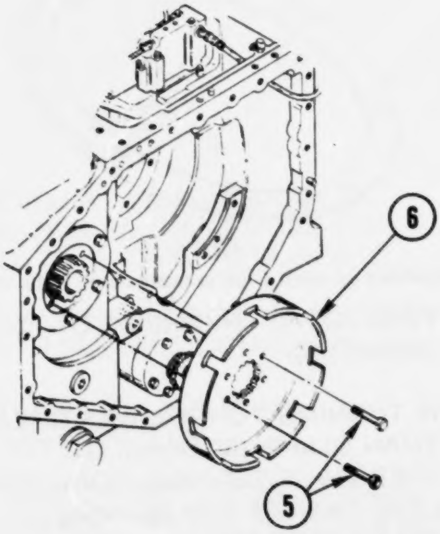
NOTE

Nicks and burrs must be removed from shim(s) before use.

111. INSTALL RETAINER (2) AND SHIM(S) (1).
    a. Working on right side of transmission, slide shim(s) (1) onto retainer (2) and press retainer into housing (3).
    b. Aline six bolt holes in retainer (2) and shim(s) (1) with housing (3). Using plastic-faced hammer, tap retainer (2) into place.
    c. Install six bolts (4).

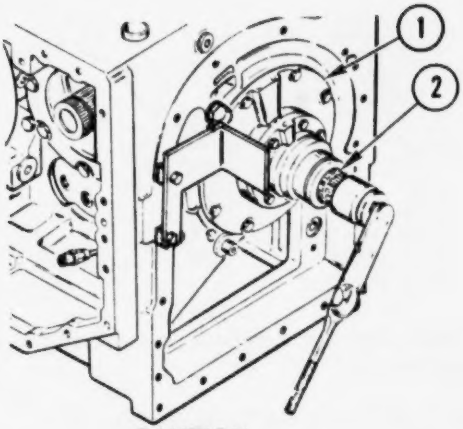
112. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (4) TO 25-30 ft-lb (3-4 mkg).

113. ROTATE TRANSMISSION SO BOTTOM SIDE IS UP AND GO TO STEP 88.



114. REMOVE TWO SCREWS (5) AND CLUTCH HOUSING (6).
    a. Working on right side of transmission, remove two screws (5) and clutch housing (6).

GO TO NEXT PAGE



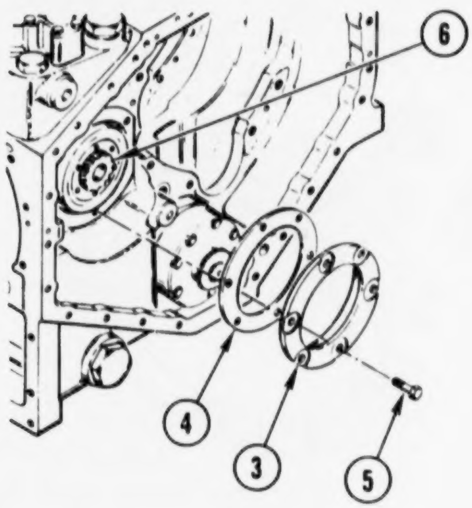
CAUTION

Do not vary speed while turning input gearshaft. Faulty readings can be obtained and damage to equipment can occur.

115. CHECK TURNING TORQUE OF INPUT BEVEL ASSEMBLY (1).

   a. Using 3/8-inch drive torque wrench with adapter and drag wrench, slowly and smoothly turn input gearshaft (2) completely around and measure turning torque.

   b. If turning torque is not 35-50 in-lb (40-58 cmkg), go to step 116. If turning torque is 35-50 in-lb (40-58 cmkg), go to step 124.

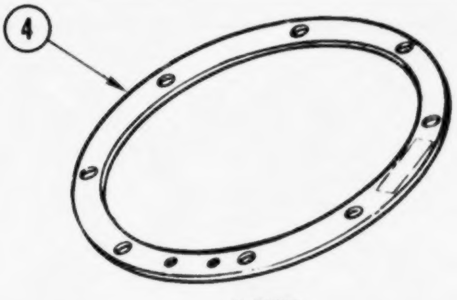


116. REMOVE RETAINER (3) AND SHIM(S) (4).

   a. Working on right side of transmission, remove six bolts (5).

   b. Using plastic-faced hammer, tap spur gearshaft (6) from opposite side of transmission to loosen retainer (3).

   c. Using pry bar behind shim(s) (4), carefully remove retainer (3) and shim(s).

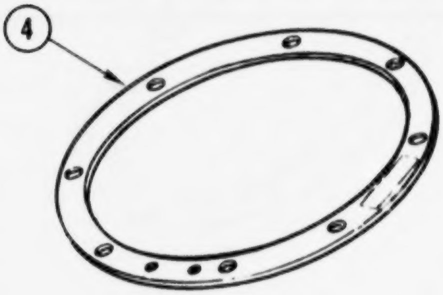


NOTE

Thickness of each shim is marked on face of shim.

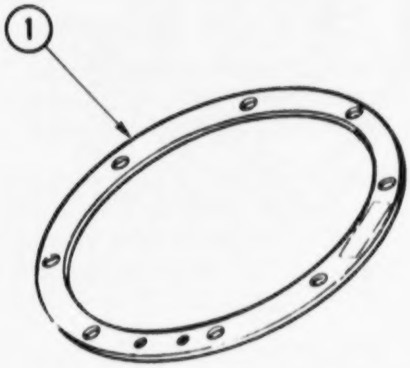
117. FIND TOTAL THICKNESS OF ALL SHIM(S) (4).

118. IF TURNING TORQUE WAS GREATER THAN 50 in-lb (52 cmkg), GO TO STEP 119. IF TURNING TORQUE WAS LESS THAN 35 in-lb (40 cmkg), GO TO STEP 120.



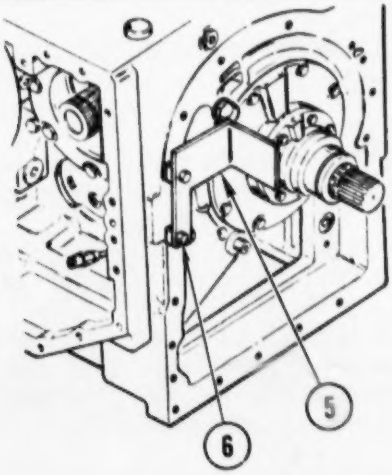
STEP 117	**0.**	**INCH**
	+0.005	**INCH**
STEP 119	**0.**	**INCH**

119. REPLACE SHIM(S) (4) WITH SET THAT IS 0.005 INCH (0.13 mm) THICKER. GO TO STEP 121.

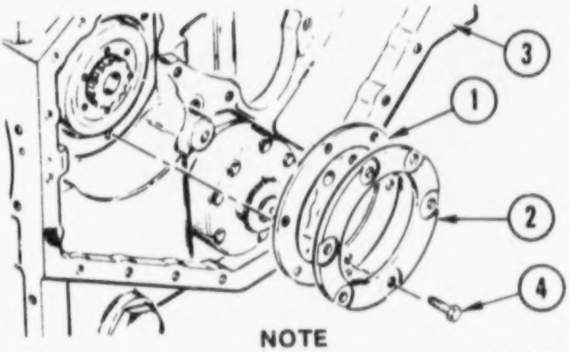


STEP 117	0.____	INCH
	–0.005	INCH
STEP 120	0.____	INCH

120. REPLACE SHIM(S) (1) WITH SET THAT IS 0.005 INCH (0.13 mm) THINNER.



124. REMOVE BRACKET (5).
   a. Remove two screws (6) and bracket (5). Place screws with power takeoff assembly for reinstallation.



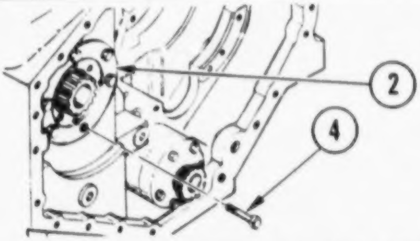
NOTE

Nicks and burrs must be removed from shim(s) before use.

121. INSTALL RIGHT SIDE SET RETAINER (2) AND SHIM(S) (1).
   a. Slide shim(s) (1) onto retainer (2) and press retainer into housing (3).
   b. Aline six bolt holes in retainer (2) and shim(s) (1) with housing (3). Using plastic-faced hammer, tap retainer into place.
   c. Install six bolts (4).

122. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (4) TO 25-30 ft-lb (3-4 mkg).

123. ROTATE TRANSMISSION SO BOTTOM SIDE IS UP AND GO TO STEP 88.



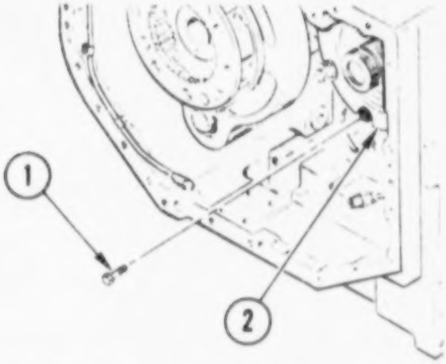
125. WORKING ON RIGHT SIDE OF TRANSMISSION, REMOVE SIX BOLTS (4) FROM RETAINER (2).

126. COAT THREADS OF SIX BOLTS (4) WITH SEALANT COMPOUND.

127. INSTALL SIX BOLTS (4) IN RETAINER (2).

128. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (4) TO 25-30 ft-lb (3-4 mkg).

GO TO NEXT PAGE

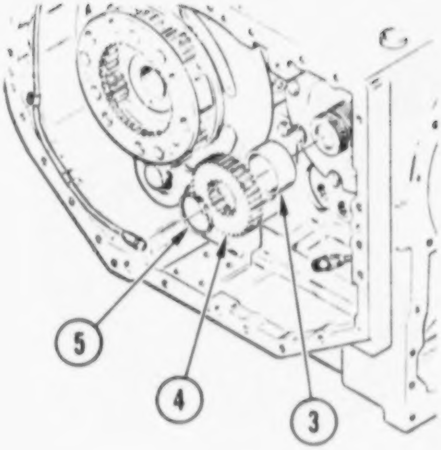


129. WORKING ON LEFT SIDE OF TRANSMISSION, REMOVE SIX BOLTS (1) FROM RETAINER (2).

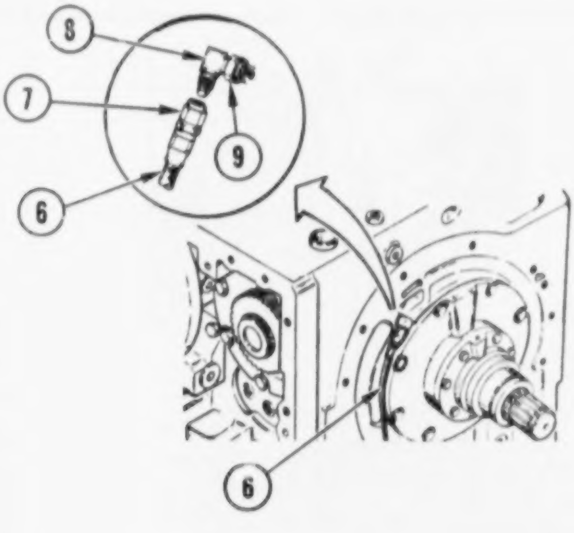
130. COAT THREADS OF SIX BOLTS (1) WITH SEALANT COMPOUND.

131. INSTALL SIX BOLTS (1) IN RETAINER (2).

132. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (1) TO 25-30 ft-lb (3-4 mkg).



133. WORKING ON LEFT SIDE OF TRANSMISSION, INSTALL SPACER (3) AND GEAR (4).
    a. Install spacer (3).
    b. Install gear (4) bevel side out.
    c. Using retaining-ring pliers, install retaining ring (5) with sharp edge out.



134. INSTALL HOSE ASSEMBLY (6).
    a. Connect hose nut (7) to elbow (8).

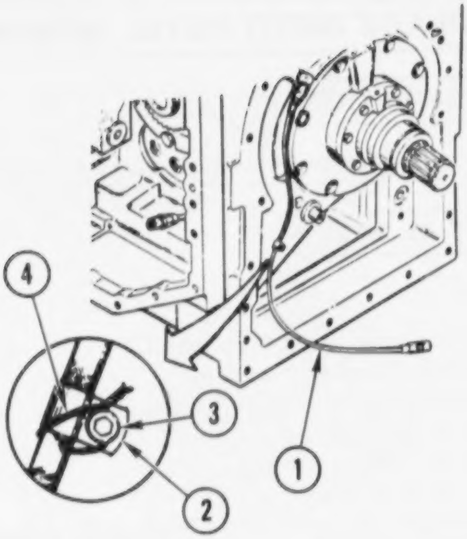
135. HOLD ELBOW (8). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (9) TO 125-135 in-lb (144-155 cmkg).

136. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (7) TO 125-135 in-lb (144-155 cmkg).

137. SECURE HOSE ASSEMBLY (1).
    a. Install clamp (2).
    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new screw (3).

138. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (3) TO 35-45 in-lb (40-52 cmkg).

139. USING WIRE TWISTER PLIERS, INSTALL NEW LOCKWIRE (4) IN SCREW (3) AND AROUND CLAMP (2).



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140. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

141. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

142. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

143. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

144. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

145. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

146. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

147. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

148. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

149. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

150. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

151. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

152. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

153. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

154. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPLACE INPUT BEVEL ASSEMBLY SHAFT SEALS

DESCRIPTION

This task covers: Remove (page 4-122). Install (page 4-124).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Inside/outside indicator caliper — (Item 41, App C)
Micrometer caliper set — (Item 52, App C)
Retaining-ring pliers — (Item 59, App C)
Snap-ring guide fixture — (Item 73, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Petrolatum — (Item 7, App B)
Wiping rag — (Item 13, App B)
Wood block — (Item 1, App D)
Retaining ring

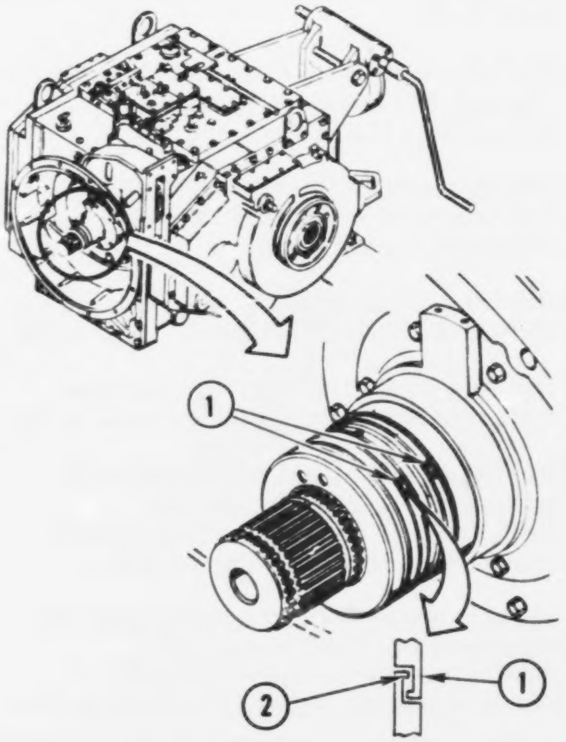
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

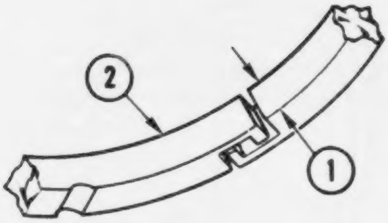


1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

CAUTION

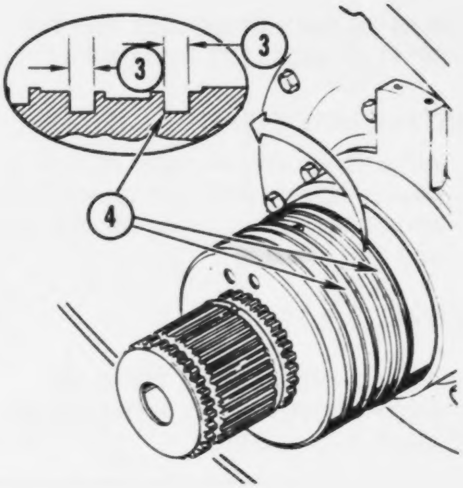
Do not spread seals more than needed. Seals are brittle and easily broken.

3. REMOVE TWO SHAFT SEALS (1).
   a. Squeeze each seal (1) with fingers until hooks (2) release.
   b. Spread open and remove each seal (1).

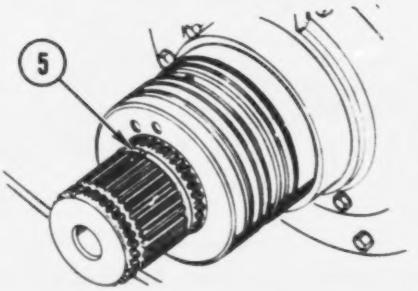


4. MEASURE WIDTH (1) OF SEALS (2).
   a. Using micrometer caliper set, measure width (1) of seal (2).
   b. Replace seal (2) if width (1) is less than 0.120 inches (3.05 mm).
   c. Repeat steps 4a and 4b for remaining seal (2).

5. INSPECT SEALS (2).
   a. Inspect seal (2) for damage. See page 2-5.
   b. Replace seal (2) if damaged.
   c. Repeat steps 5a and 5b for remaining seal (2).



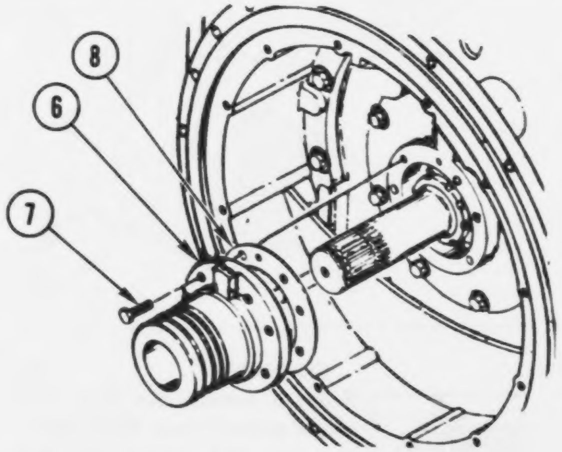
6. MEASURE WIDTH (3) OF SEAL GROOVES (4).
   a. Using indicator caliper, measure width (3) of two seal grooves (4).
   b. If either width (3) is more than 0.131 inches (3.33 mm), go to step 7. If not, go to step 14.



WARNING

Retaining ring is installed under high tension. Use care when removing retaining ring. Personnel can be injured. Always wear goggles.

7. USING RETAINING RING PLIERS, REMOVE AND DISCARD RETAINING RING (5).



8. REMOVE BODY HUB (6).
   a. Remove six screws (7).
   b. Remove hub (6) and gasket (8). Discard gasket.

9. REPLACE HUB (6).

GO TO NEXT PAGE

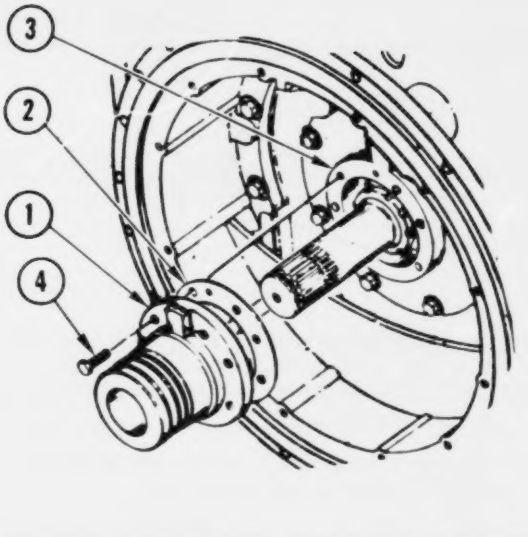
INSTALL

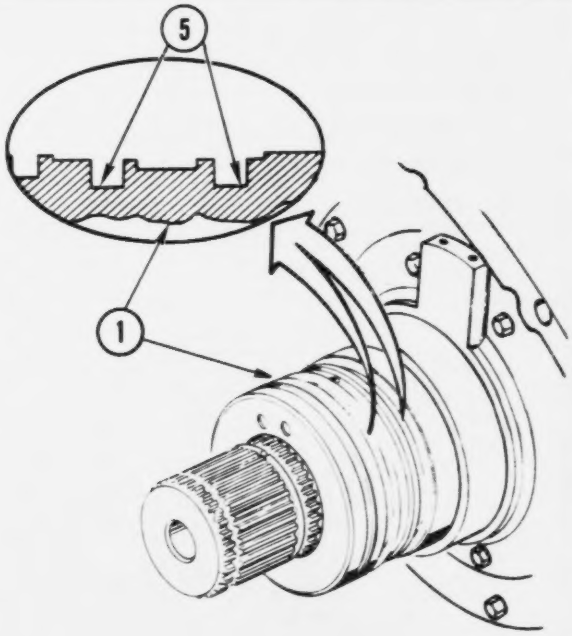
10. IF HUB (1) WAS REMOVED, GO TO STEP 11. IF NOT, GO TO STEP 14.

11. INSTALL NEW HUB (1).
    a. Aline screw and oil holes in new gasket (2) and new hub (1) with screw and oil holes in housing (3). Put gasket and hub in place.

12. INSTALL SIX SCREWS (4).

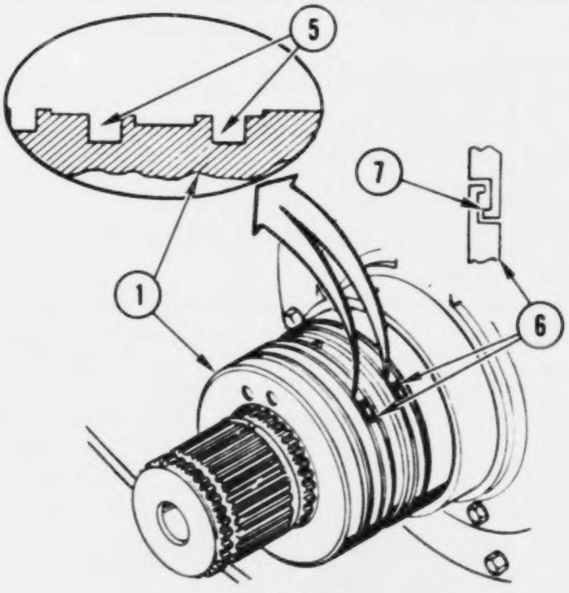
13. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (4) TO 20-25 ft-lb (3 mkg).





WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

14. CLEAN SEAL GROOVES (5) IN HUB (1).
    a. Use wiping rag dampened with cleaning solvent.



CAUTION
Do not spread seals more than needed. Seals are brittle and easily broken.

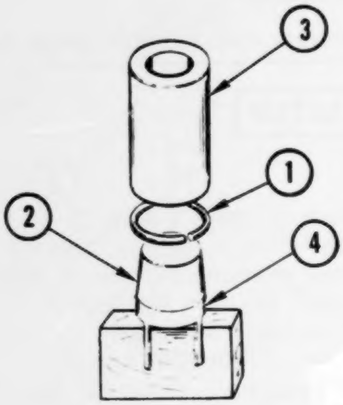
15. INSTALL TWO SEALS (6).
    a. Coat two seals (6) with petrolatum.
    b. Install seals (6) in grooves (5) in hub (1).
    c. Hook each seal (6) so that hooks (7) are closed.

16. IF HUB (1) WAS REMOVED, GO TO STEP 17. IF NOT, GO TO STEP 19.

NOTE

Tube has a large opening and small opening. Use small opening to slant ring onto guide. Use large opening to move it onto flat shoulder of guide.

17. PRESS NEW RETAINING RING (1) ONTO SNAP RING GUIDE (2).
    a. Place wood block in arbor press.
    b. Place guide (2) on block.
    c. Put new ring (1) onto guide (2).
    d. Set snap ring guide tube (3) on new ring (1).
    e. Using tube (3) press new ring (1) onto guide (2) until seated on shoulder (4). Remove from arbor press.



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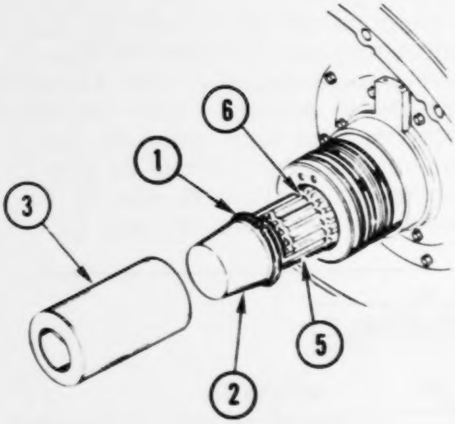
18. INSTALL NEW RING (1).
    a. Place guide (2) with new ring (1) on spline (5).
    b. Slide tube (3) on guide (2).
    c. Using plastic-faced hand hammer, tap tube (3) until new ring (1) slides off guide (2) into ring groove (6).

19. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

20. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.



END OF TASK

REPAIR INPUT BEVEL ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-126). Assemble (page 4-133).

INITIAL SETUP

Tools:

- Arbor press — (Item 3, App C)
- Bearing installer — (Item 9, App C)
- Bearing nut wrench — (Item 15, App C)
- Drag wrench — (Item 24, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Leather gloves — (Item 42, App C)
- Mechanical puller — (Item 48, App C)
- Mechanical puller kit — (Item 49, App C)
- Micrometer caliper set — (Item 52, App C)
- Retaining-ring pliers — (Item 59, App C)
- Snap-ring guide fixture – (Item 73, App C)
- Socket wrench adapter — (Item 74, App C)
- Telescoping gage set — (Item 93, App C)
- Thermal drying oven — (Item 94, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Dry ice — (Item 4, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Wood block — (Item 1, App D)
- Wood block (2) – (Item 6, App D)
- Gasket
- Key washer
- Retaining ring

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

TM 9-214

Equipment Conditions:

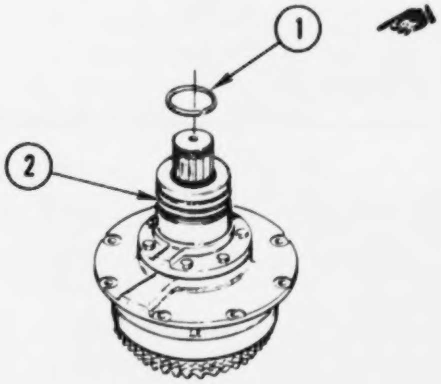
Input bevel assembly on workbench. See page 4-94.

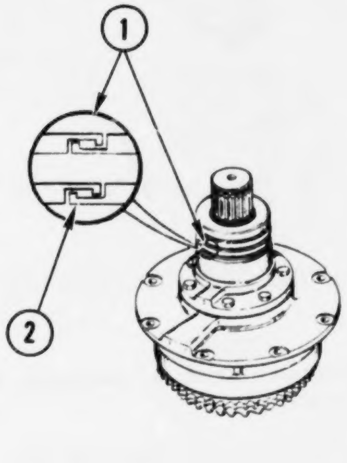
DISASSEMBLE

WARNING

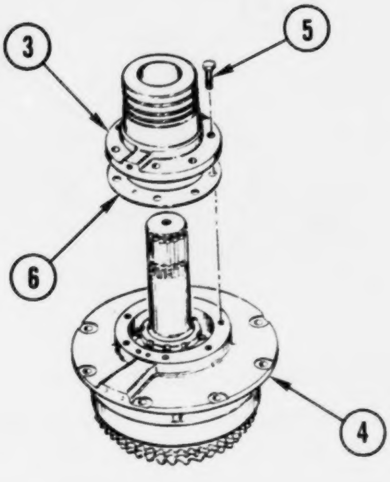
Retaining ring is installed under high tension. Use care when removing retaining ring. Personnel can be injured. Always wear goggles.

1. USING RETAINING-RING PLIERS, REMOVE AND DISCARD RETAINING RING (1).
2. INSPECT SHAFT SEALS (2). See page 2-5.
   a. If seals (2) are damaged, go to step 3. If not, go to step 4.

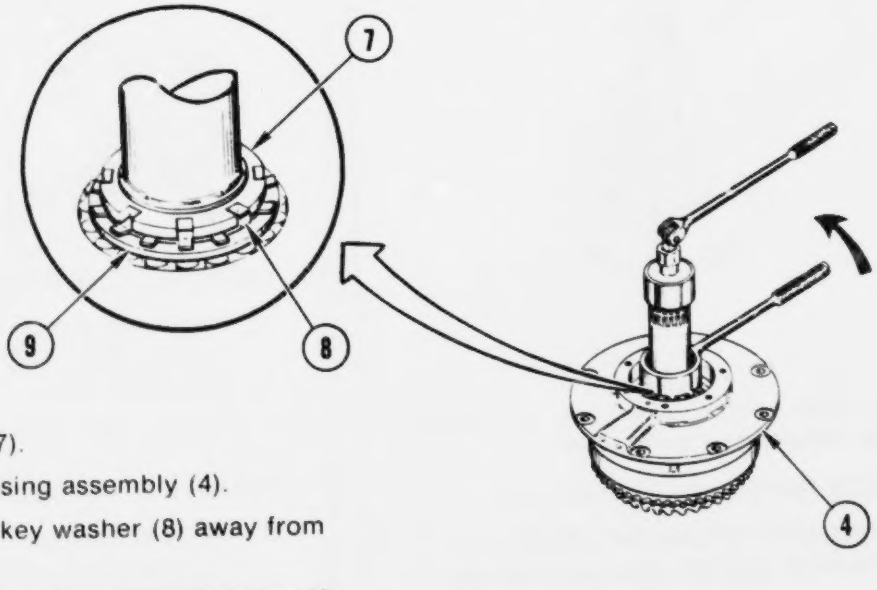




3. REMOVE TWO SEALS (1).
   a. Squeeze each seal (1) with fingers until hooks (2) release.
   b. Spread open and remove each seal (1). Discard seals.



4. REMOVE BODY HUB (3).
   a. (H) Hold bearing housing assembly (4).
   b. Remove six screws (5).
   c. Remove hub (3) and gasket (6). Discard gasket.



5. REMOVE NUT (7).
   a. (H) Hold housing assembly (4).
   b. Bend tab on key washer (8) away from nut (7).
   c. Using bearing nut wrench, drag wrench, and hinged handle, loosen nut (7).
   d. Remove nut (7), key washer (8), and washer (9). Discard key washer.

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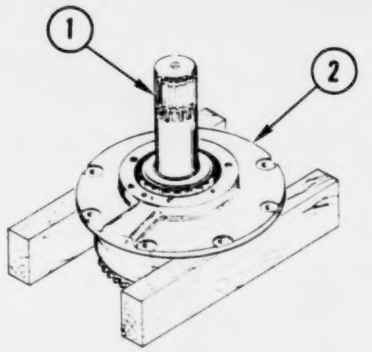
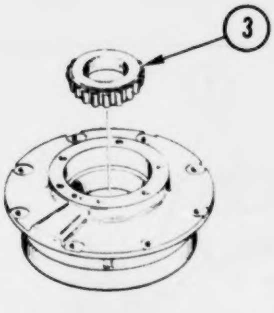


6. REMOVE BEVEL GEAR SHAFT (1).
   a. Place housing assembly (2) on two wood blocks (Item 6).
   b. Using plastic-faced hammer, tap bevel gear shaft (1) from housing assembly (2).
   c. Place housing assembly (2) on workbench.

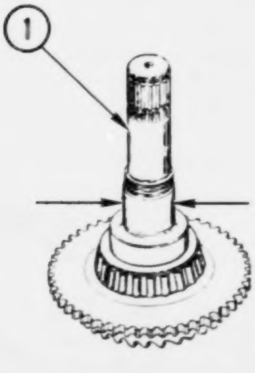


7. REMOVE CONE AND ROLLERS (3).

NOTE

If either cone or rollers is damaged, both must be discarded.

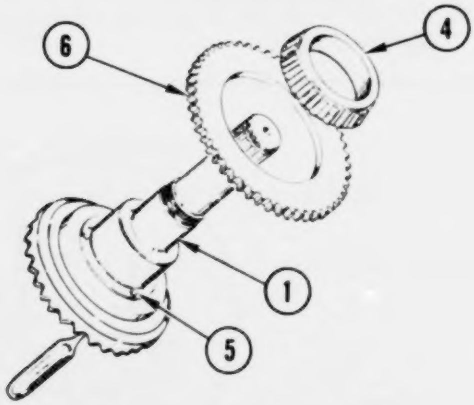
8. INSPECT CONE AND ROLLERS (3).
   a. Inspect cone and rollers (3) for damage. See TM 9-214.
   b. Discard cone and rollers (3) if damaged.



NOTE

If gear shaft is worn, bevel gear and pinion must be replaced as a matched set.

9. CHECK BEVEL GEAR SHAFT (1).
   a. Using micrometer caliper set, measure outside diameter of shaft (1).
   b. If measurement of shaft (1) is less than 2.2500 inches (57.150 mm), go to step 10. If not, go to step 16.

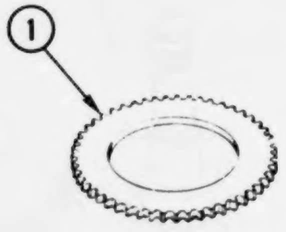


10. REMOVE CONE AND ROLLERS (4).
    a. Insert drift punch through holes (5) in gear shaft (1) and tap off cone and rollers (4).
    b. Discard cone and rollers (4).

11. REMOVE SPUR GEAR (6).
    a. Using arbor press, remove gear (6).

12. DISCARD BEVEL GEAR SHAFT (1).

13. REPLACE PINION. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

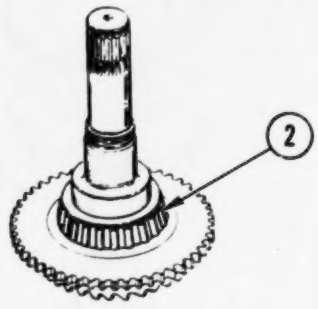


14. INSPECT GEAR (1).

    a. Inspect gear (1) for damage. See page 2-5.

    b. Discard gear (1) if damaged.

15. GO TO STEP 26.



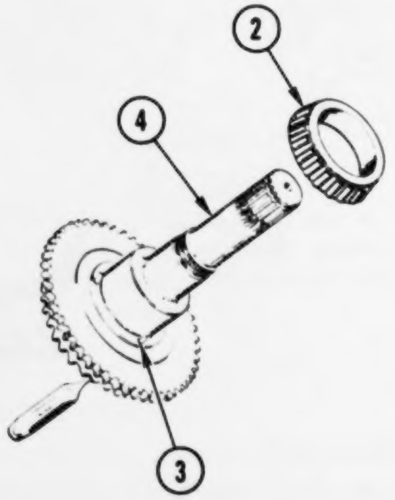
NOTE

If either cone or rollers is damaged, both must be discarded.

16. INSPECT CONE AND ROLLERS (2).

    a. Inspect cone and rollers (2) for damage. See TM 9-214.

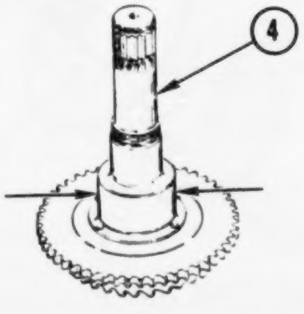
    b. If cone and rollers (2) are damaged, go to step 17. If not, go to step 22.



17. REMOVE CONE AND ROLLERS (2).

    a. Insert drift punch through holes (3) in gear shaft (4) and evenly tap off cone and rollers (2).

    b. Discard cone and rollers (2).



18. CHECK BEVEL GEAR SHAFT (4).

    a. Using micrometer caliper set, measure outside diameter of shaft (4).

    b. If measurement of shaft (4) is less than 3.3765 inches (85.763 mm), go to step 19. If not, go to step 22.

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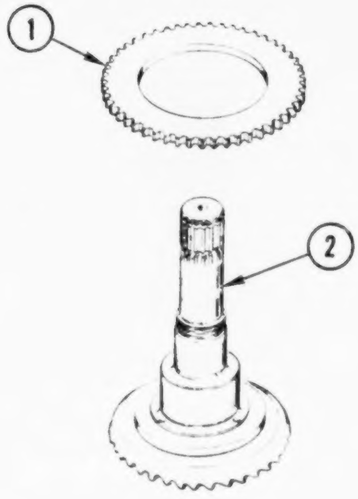
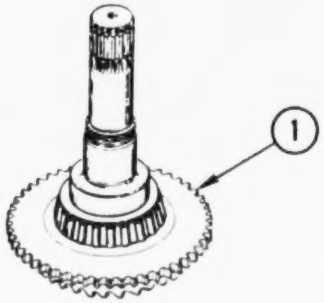


19. REMOVE GEAR (1).
    a. Using arbor press, remove gear (1).

20. DISCARD BEVEL GEAR SHAFT (2).

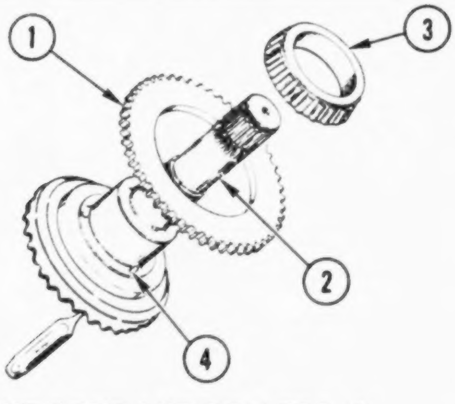
21. REPLACE PINION. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.



NOTE

Cone and rollers and spur gear may have been removed.

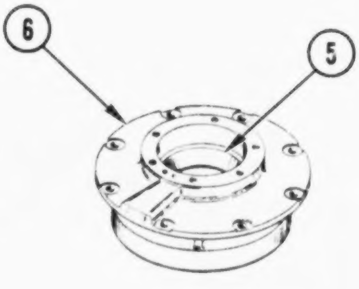
22. INSPECT GEAR (1).
    a. Inspect gear (1) for damage. See page 2-5.
    b. If gear (1) is damaged, go to step 23. If not, go to step 26.



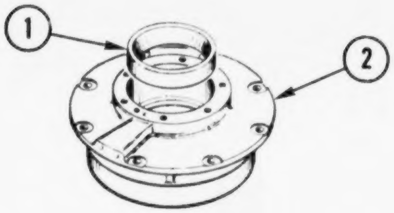
23. REMOVE CONE AND ROLLERS (3) IF NOT REMOVED.
    a. Insert drift punch through holes (4) in gear shaft (2) and evenly tap off cone and rollers (3).
    b. Discard cone and rollers (3).

24. REMOVE GEAR (1) IF NOT REMOVED.
    a. Using arbor press, remove gear (1).

25. DISCARD GEAR (1).



26. INSPECT OUTER ROLLER CUP (5) IN HOUSING ASSEMBLY (6).
    a. Inspect cup (5) for damage. See TM 9-214.
    b. If cup (5) is damaged or cone and rollers were discarded in step 8, cup must also be discarded. Go to step 27. If cup is not damaged, go to step 28.



WARNING

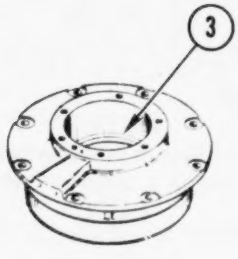
Do not handle hot or cold parts without protective gloves. Personnel can be injured.

27. REMOVE CUP (1).

    a. Using oven, heat housing assembly (2) to 150° F (66° C).

    b. Use gloves to hold housing assembly (2). Using mechanical puller through front of housing assembly, remove and discard cup (1).

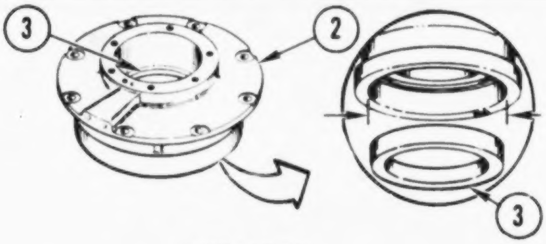
    c. Discard cone and rollers removed in step 8 if not already discarded.



28. INSPECT INNER ROLLER CUP (3).

    a. Inspect cup (3) for damage. See TM 9-214.

    b. If cup (3) is damaged or cone and rollers were discarded in step 17, cup must also be discarded. Go to step 29. If cup is not damaged, go to step 31.



WARNING

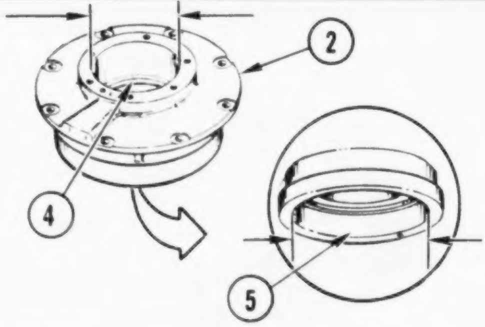
Do not handle hot or cold parts without protective gloves. Personnel can be injured.

29. REMOVE CUP (3).

    a. Using oven, heat housing assembly (2) to 150° F (66° C).

    b. Use gloves to hold housing assembly (2). Using mechanical puller through rear of housing assembly, remove and discard cup (3).

    c. Discard cone and rollers removed in step 17 if not already discarded.



30. CHECK HOUSING ASSEMBLY (2).

    a. Let housing assembly (2) return to room temperature.

    b. Using micrometer caliper set and telescoping gage set, measure inside diameter of bore (4). Replace housing assembly (2) if measurement is more than 3.8417 inches (97.579 mm).

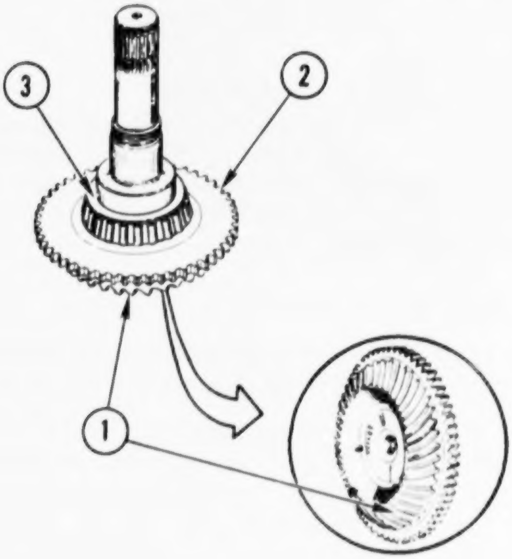
    c. Using micrometer caliper set and telescoping gage set, measure inside diameter of bore (5). Replace housing assembly (2) if measurement is more than 5.5930 inches (142.062 mm).

GO TO NEXT PAGE

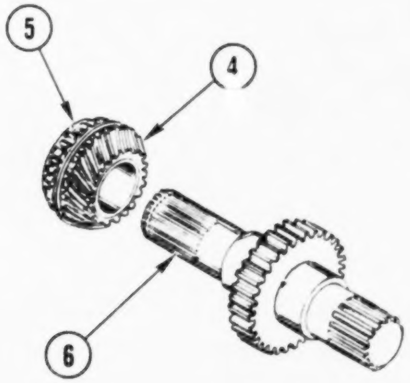
NOTE

If bevel gear or pinion is damaged, both gears must be replaced as a matched set.

31. INSPECT BEVEL GEAR (1).
    a. Inspect gear (1) for excessive wear or damage. See page 2-5.
    b. If gear (1) is worn or damaged, and gear (2) or cone and rollers (3) were not removed, do steps 23 and 24. Go to step 32.
    c. If gear (1) is worn or damaged, and gear (2) or cone and rollers (3) were removed, go to step 32.
    d. If gear (1) is not worn or damaged, go to step 35.

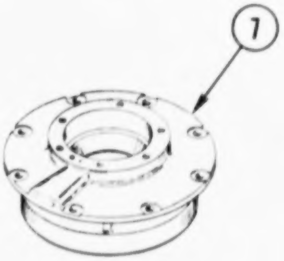


32. DISCARD BEVEL GEAR (1).

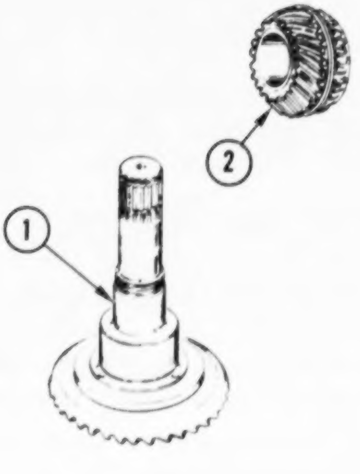


33. REMOVE SPIRAL BEVEL PINION (4) WITH CONE AND ROLLERS (5) FROM GEARSHAFT (6), IF NOT REMOVED.
    a. Using mechanical puller kit, remove pinion (4) from gearshaft (6).

34. REPLACE PINION (4) AND CONE AND ROLLERS (5).



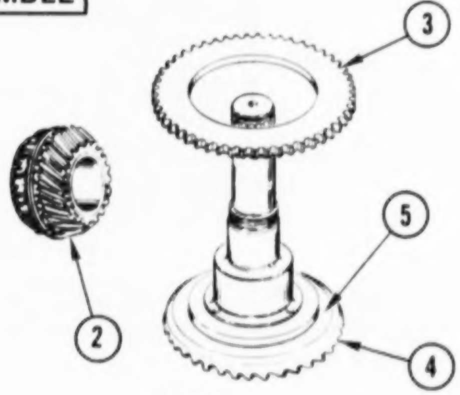
34.1 IF HOUSING (7) WAS NOT REPLACED, INSPECT INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR INPUT BEVEL HOUSING INSERTS, page 4-138.



35. CLEAN INPUT BEVEL ASSEMBLY (1) AND PINION (2).
    a. Clean assembly and hardware. See page 2-2.

36. INSPECT INPUT BEVEL ASSEMBLY (1) AND PINION (2).
    a. Inspect assembly, piece parts, and inserts. See page 2-5.
    b. (Deleted)

ASSEMBLE



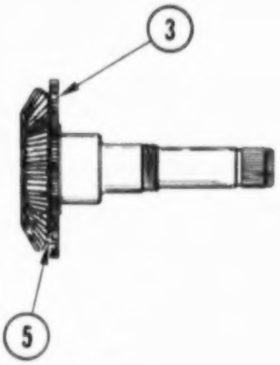
NOTE

Bevel gear and pinion are a matched set and must be replaced together. Serial numbers of gear set must match.

37. IF GEAR (3) WAS REMOVED, GO TO STEP 38. IF NOT, GO TO STEP 41.

38. VERIFY SERIAL NUMBERS ON BEVEL GEAR (4) AND PINION (2) MATCH.

39. PREPARE GEAR (3) FOR MOUNTING.
    a. Using oven, heat gear (3) to 270°-300° F (132°-149° C).
    b. Coat gear mounting surface (5) with sealant compound.



WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

40. INSTALL GEAR (3).
    a. Using pliers and gloves, fully seat hot gear (3) on mounting surface (5). Let parts return to room temperature.

GO TO NEXT PAGE

41. COAT ALL PARTS WITH TRANSMISSION OIL.

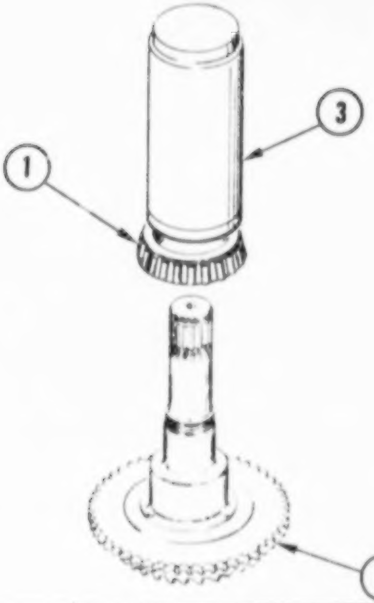
42. IF INNER CONE AND ROLLERS (1) WERE REMOVED, GO TO STEP 43. IF NOT, GO TO STEP 44.

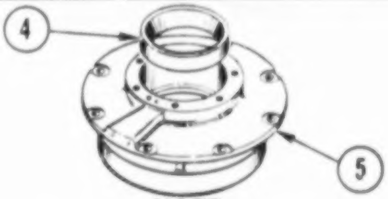
43. INSTALL NEW CONE AND ROLLERS (1).

    a. Set up gear assembly (2) in arbor press.

    b. Using bearing installer (3), press on new cone and rollers (1) large end first.

    c. Fully seat cone and rollers (1) on gear assembly (2).





NOTE

If both cups were removed, steps 44 and 46 can be performed at same time. Housing assembly can be tipped on its side to hold cups in place while warming.

44. IF OUTER CUP (4) WAS REMOVED, GO TO STEP 45. IF NOT, GO TO STEP 46.

WARNING

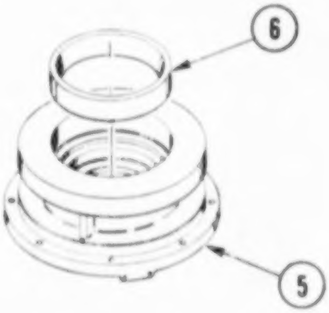
Do not handle hot or cold parts without protective gloves. Personnel can be injured.

45. INSTALL NEW CUP (4).

    a. Pack new cup (4) in dry ice for two hours.

    b. Using gloves, fully seat new cup (4) in housing assembly (5), thick end first.

    c. Let parts return to room temperature.



46. IF INNER CUP (6) WAS REMOVED, GO TO STEP 47. IF NOT, GO TO STEP 48.

WARNING

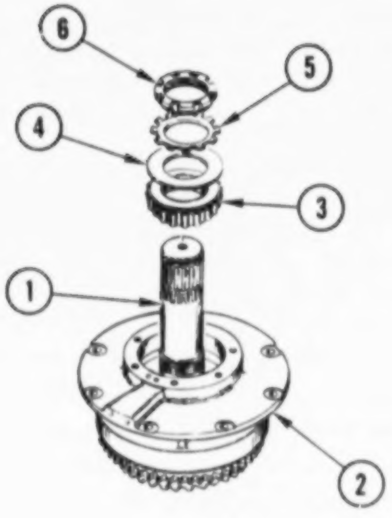
Do not handle hot or cold parts without protective gloves. Personnel can be injured.

47. INSTALL NEW CUP (6).

    a. Pack new cup (6) in dry ice for two hours.

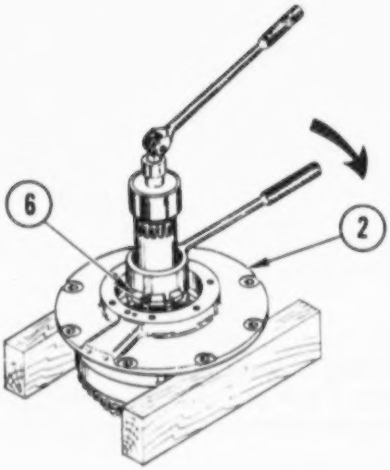
    b. Using gloves, fully seat new cup (6) in housing assembly (5), thick end first.

    c. Let parts return to room temperature.



48. INSTALL GEAR ASSEMBLY (1).
    a. Place housing assembly (2) over gear assembly (1).

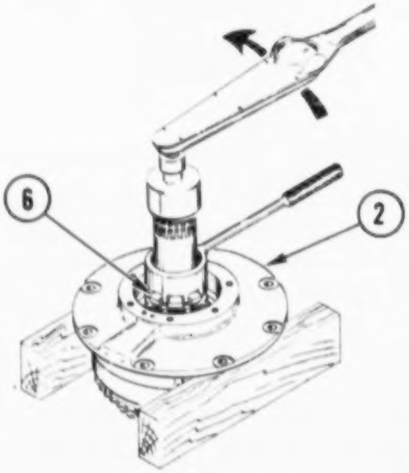
49. INSTALL CONE AND ROLLERS (3), SMALL END FIRST. INSTALL WASHER (4), NEW KEY WASHER (5), AND NUT (6).



50. PLACE HOUSING ASSEMBLY (2) ON TWO WOOD BLOCKS (ITEM 6).
    a. Put blocks under outside edge of housing assembly (2).

51. USING BEARING NUT WRENCH, DRAG WRENCH, AND HINGED HANDLE, TIGHTEN NUT (6).
    a. (H) Hold housing assembly (2).
    b. Tighten nut (6) a little with bearing nut wrench.

52. USING 3/8-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND DRAG WRENCH, CHECK BEARING DRAG.
    a. (H) Hold housing assembly (2).
    b. Turn torque wrench slowly one full turn. If torque is 15-20 in-lb (17-23 cmkg), go to step 53.
    c. If torque is less than 15 in-lb (17 cmkg), go to step 51. If torque is more than 20 in-lb (23 cmkg), loosen nut (6), then go to step 51.



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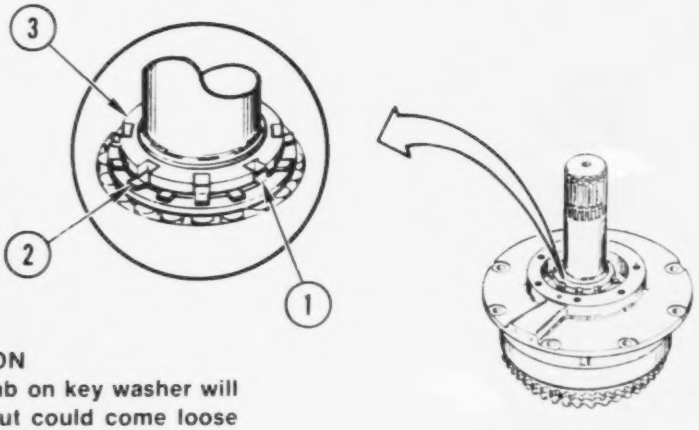
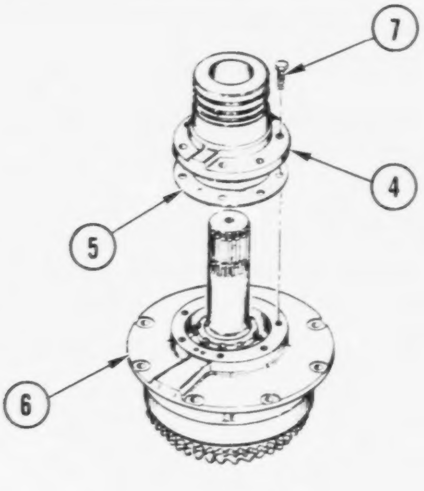


CAUTION

Make sure at least one tab on key washer will go into a slot on nut. Nut could come loose during operation and damage equipment.

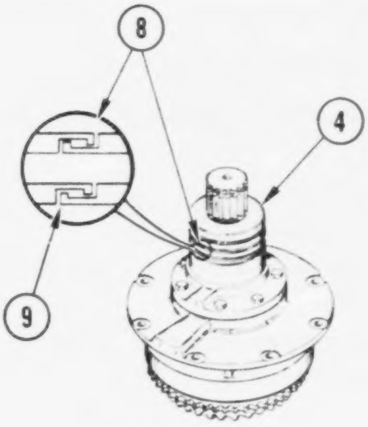
53. BEND ONE TAB (1) ON KEY WASHER (2) INTO SLOT ON NUT (3).



54. INSTALL HUB (4).
    a. Aline screw and oil holes in new gasket (5) and hub (4) with screw and oil holes in housing assembly (6). Put gasket and hub in place.

55. INSTALL SIX SCREWS (7).

56. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (7) TO 20-25 ft-lb (3 mkg).
    a. (H) Hold housing assembly (6).



CAUTION

Do not spread seals more than needed. Seals are brittle and easily broken.

57. INSTALL TWO NEW SEALS (8) IF REMOVED.
    a. Coat two new seals (8) with transmission oil.
    b. Install seals (8) in grooves in hub (4).
    c. Hook each seal (8) so that hooks (9) are closed.

NOTE

Tube has a large opening and a small opening. Use small opening to slant ring onto guide. Use large opening to move it onto flat shoulder of guide.

58. PRESS NEW RETAINING RING (1) ONTO SNAP RING GUIDE (2).

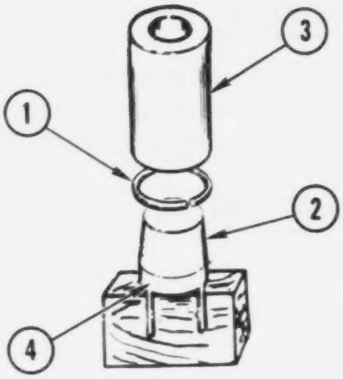
    a. Place wood block (Item 1) in arbor press.

    b. Place guide (2) on block.

    c. Put new retaining ring (1) on guide (2).

    d. Set snap-ring guide tube (3) on new retaining ring (1).

    e. Using tube (3), press new retaining ring (1) onto guide (2) until seated on shoulder (4). Remove from arbor press.



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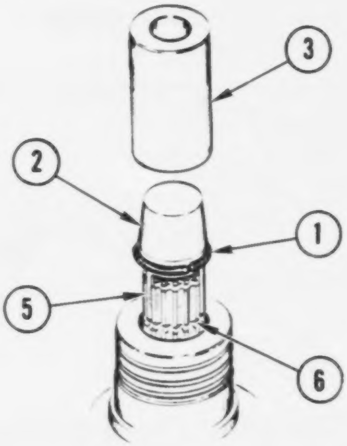
59. INSTALL NEW RETAINING RING (1).

    a. Place guide (2) with new retaining ring (1) on spline (5).

    b. Slide tube (3) on guide (2).

    c. Using plastic-faced hammer, tap tube (3) until new retaining ring (1) slides off guide (2) into retaining ring groove (6).



END OF TASK

REPAIR INPUT BEVEL HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the input bevel housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

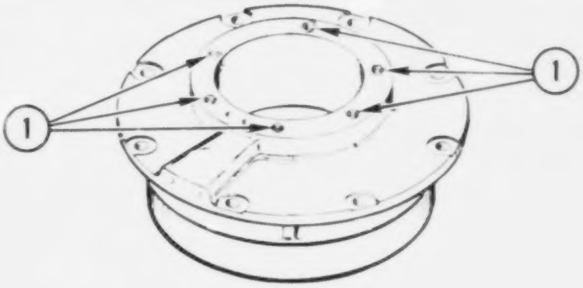
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Input bevel housing on workbench See page 4-126.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No	Insert No STANDARD/OVERSIZE	Removal Tool No	Step Drill No	Thread Cutting Tap Tool No	Swage Tool No With Swage Tool Stop No	Counterbore Depth	Drive Wrench No	Installation Depth Below Surface
1	M45932/1-17L SR314L	SR31R		SR31T	RZA12788-3 RZA12656-3	.097-.107 in. 2.46-2.72 mm	SR31WA	.035-.045 in. .889-1.14 mm
	M45932/3-17L SRW314L	SRW31R	SRW31D	SRW31T	RZA12789-3 RZA12791-3	.097-.107 in. 2.46-2.72 mm	SR31WA	.035-.045 in. .889-1.14 mm

END OF TASK

Section IV. POWER TAKEOFF ASSEMBLY

TASK INDEX

Task	Page
Replace Power Takeoff Assembly	4-140
Repair Power Takeoff Assembly	4-144
Repair Power Takeoff Housing Inserts	4-148

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE POWER TAKEOFF ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-140). Install (page 4-142).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Cleaning solvent—(Item 1, App B)
Petrolatum—(Item 7, App B)
Wiping rag—(Item 13, App B)
Lock washer (20)
Transmission repair kit

Personnel Required:

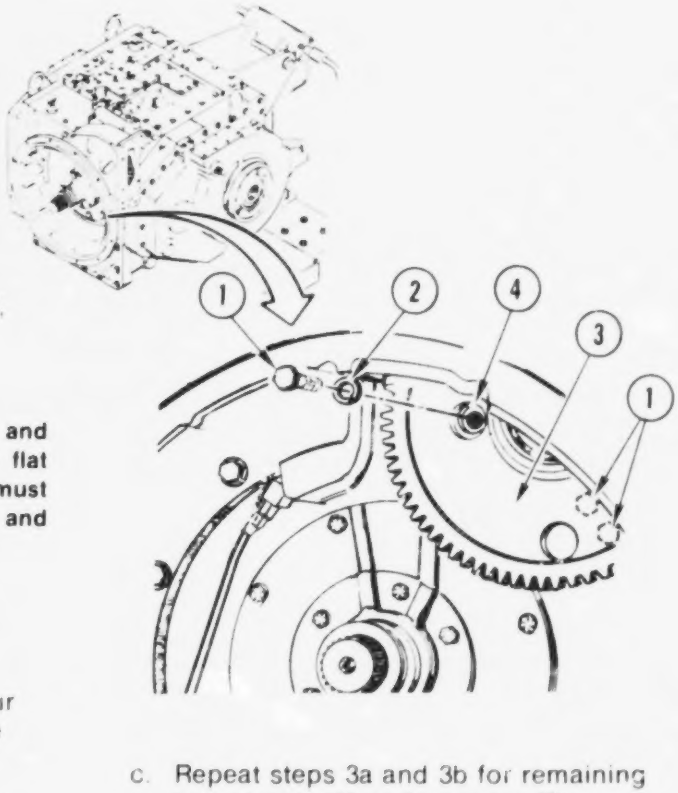
Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

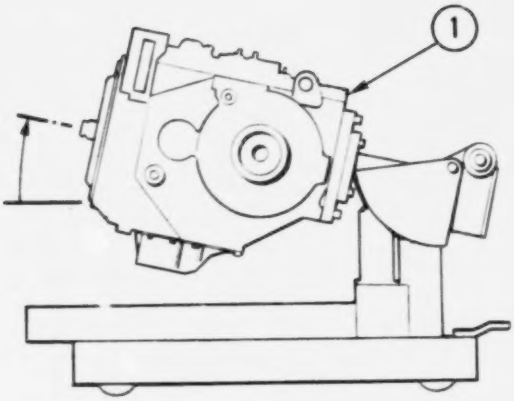
1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.



NOTE

Early transmissions have lock washers and grade 5 bolts. Later transmissions have flat washers and grade 8 bolts. Transmissions must be reassembled with same type washers and bolts as removed.

3. REMOVE THREE SCREWS (1) AND WASHERS (2) LOCATED BEHIND SPUR GEAR (3).
   a. Rotate gear (3) to aline one of four access holes (4) with one of three screws (1).
   b. Remove screw (1) and washer (2) located behind gear (3).
   c. Repeat steps 3a and 3b for remaining two screws (1) and washers (2). Discard any lock washers.



4. POSITION TRANSMISSION (1).

   a. Tilt transmission (1) up slightly.

WARNING

Power takeoff assembly can fall when screws are removed. Injury to personnel can occur.

NOTE

Early transmissions have lock washers and grade 5 bolts. Later transmissions have flat washers and grade 8 bolts. Transmissions must be reassembled with same type washers and bolts as removed.

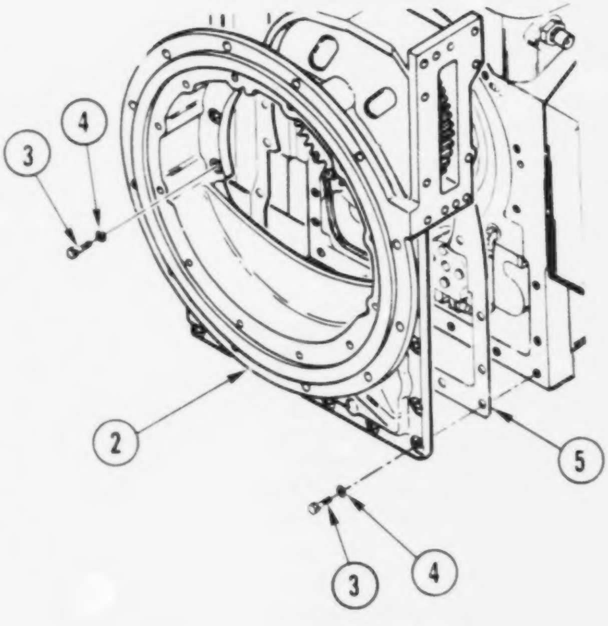
5. REPAIRER AND HELPER REMOVE POWER TAKEOFF ASSEMBLY (2).

   a. (H) Hold assembly (2) in place.

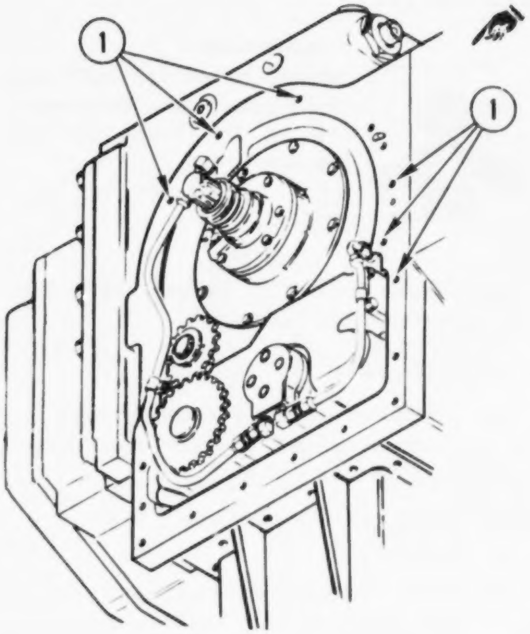
   b. Remove 11 screws (3) and washers (4) from outside of assembly (2). Remove 6 screws (3) and washers (4) from inside of assembly. Discard any lock washers.

   c. Repairer and helper remove assembly (2).

   d. Remove and discard housing input gasket (5).



GO TO NEXT PAGE



NOTE

Early transmissions have threaded holes with no inserts. Later transmissions have threaded inserts.

5.1 INSPECT MAIN HOUSING INSERTS OR THREADED HOLES (1). See page 2-5.

a. Repair threaded holes (1) if damaged. See page 2-8.

b. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

GO TO NEXT PAGE

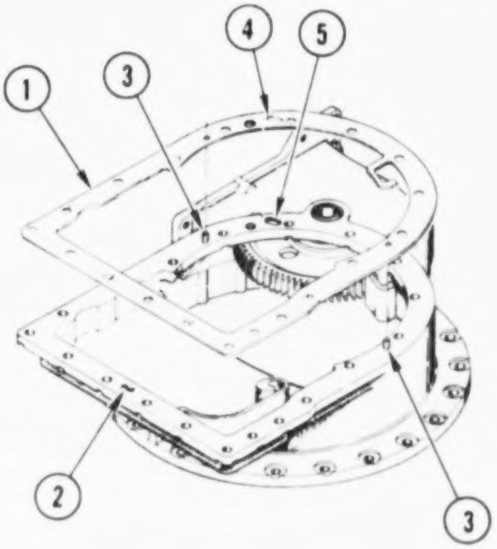
INSTALL

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

CAUTION

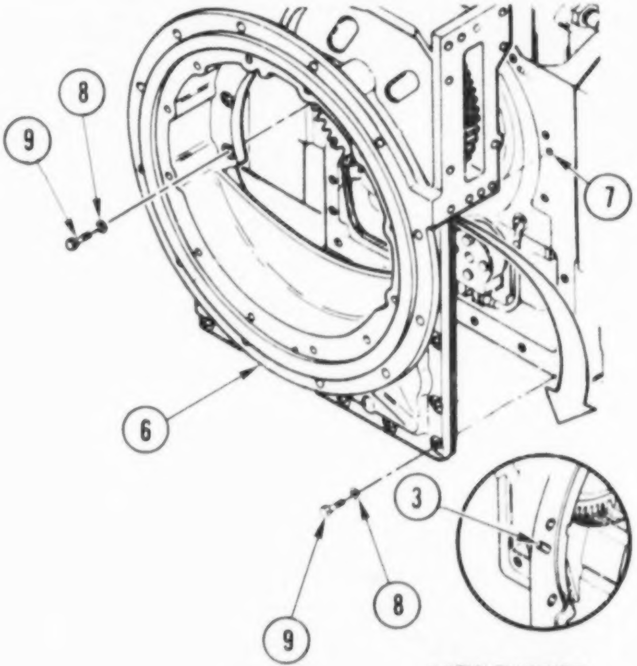
Gasket lube hole must be punched out or equipment can be damaged.



6. INSTALL NEW GASKET (1).
   a. Use a wiping rag dampened with cleaning solvent to clean mounting surface (2).
   b. Apply petrolatum to mounting surface (2).
   c. Aline new gasket (1) with pins (3) and gasket lube hole (4) with lube hole (5).
   d. Place new gasket (1) on mounting surface (2).

NOTE

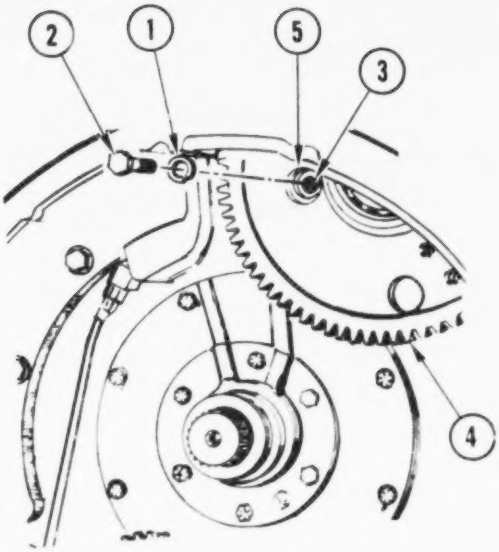
Early transmissions have lock washers and grade 5 bolts. Later transmissions have flat washers and grade 8 bolts. Transmissions must be reassembled with same type washers and bolts as removed. Old lock washers must never be reused.



7. REPAIRER AND HELPER INSTALL POWER TAKEOFF ASSEMBLY (6).
   a. Aline two pins (3) on assembly (6) with pilot holes (7). Install assembly.
   b. (H) Hold assembly (6) in place.
   c. Install 6 new lock washers or 6 flat washers (8) and 6 screws (9) inside of assembly (6). Install 11 new lock washers or 11 flat washers (8) and 11 screws (9) outside of assembly.

8. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 17 SCREWS (9) TO 45-50 ft-lb (6-7 mkg).

9. INSTALL THREE WASHERS (1) AND SCREWS (2) IN HOLES (3) LOCATED BEHIND SPUR GEAR (4).
   a. Rotate gear (4) to aline one of four access holes (5) with one of three screw holes (3).
   b. Install new lock washer or old flat washers (1) and screw (2) in hole located behind gear (4).
   c. Repeat steps 9a and 9b for remaining two washers (1) and screws (2).



10. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE THREE SCREWS (2) TO 45-50 ft-lb (6-7 mkg).

11. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

12. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

END OF TASK

REPAIR POWER TAKEOFF ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-144). Assemble page 4-146).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper set — (Item 52, App C)
Retaining-ring pliers — (Item 59, App C)
Retaining-ring pliers — (Item 61, App C)
Self-locking bolt — (Item 66, App C)
Socket wrench adapter — (Item 74, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)
Preformed packing

Personnel Required:

Track Veh Rep 63H10

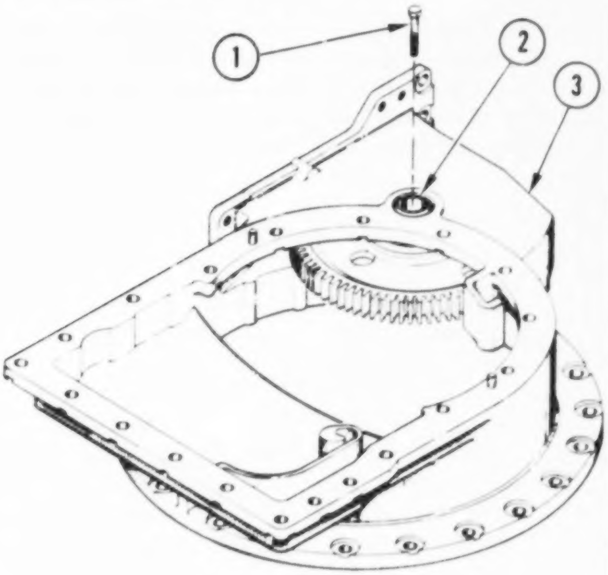
References:

TM 9-214

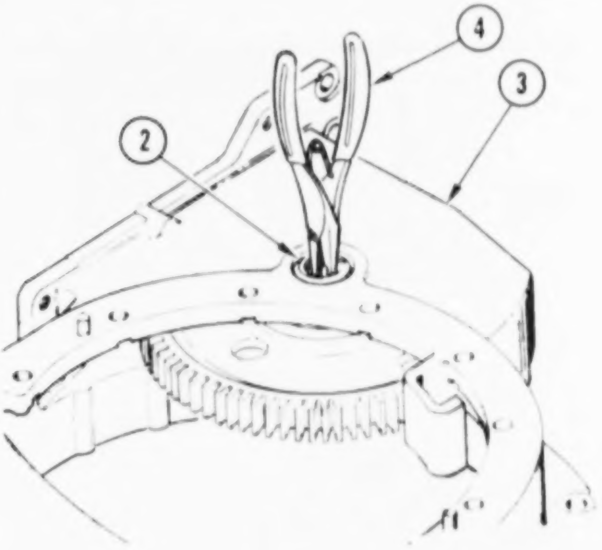
Equipment Conditions:

Power takeoff assembly on workbench. See page 4-140.

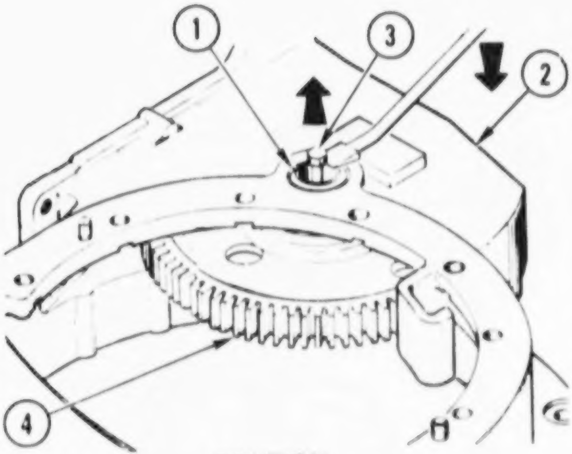
DISASSEMBLE



1. REMOVE BOLT (1) HOLDING STRAIGHT SHAFT (2) IN HOUSING (3).



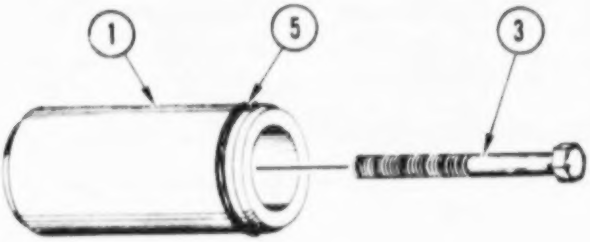
2. USING RETAINING-RING PLIERS (4) (ITEM 59), REMOVE SHAFT (2) FROM HOUSING (3).
   a. If shaft (2) does not come out, go to step 3. If shaft comes out, go to step 5.



CAUTION

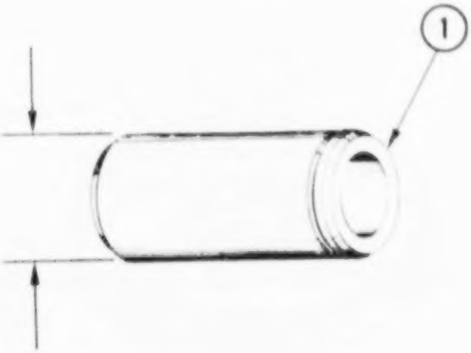
Do not pry against gasket surface. Damage to housing can occur.

3. REMOVE SHAFT (1) FROM HOUSING (2).
   - a. Thread 5/16-18 X 3-1/4 inch bolt (3) into shaft (1).
   - b. Position piece of flat stock under pry bar to prevent damage to housing (2).
   - c. While supporting spur gear (4), pry outward against head of bolt (3) to remove shaft (1).

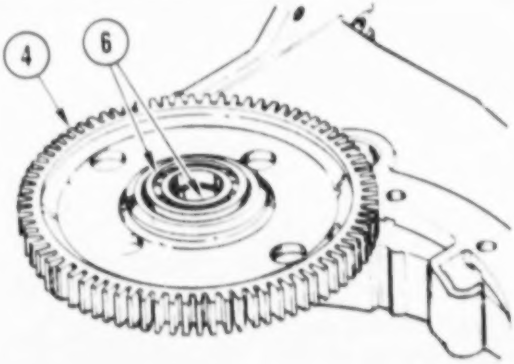


4. REMOVE BOLT (3) FROM SHAFT (1).

5. REMOVE AND DISCARD PREFORMED PACKING (5).



6. CHECK SHAFT (1).
   - a. Using micrometer caliper set, measure diameter of shaft (1).
   - b. Replace shaft (1) if measurement is less than 1.5733 inches (39.961 mm).



7. REMOVE GEAR (4) WITH TWO BALL BEARINGS (6).

8. INSPECT TWO BEARINGS (6).
   - a. Inspect bearings (6) for damage. See TM 9-214.
   - b. If bearings (6) are damaged, go to step 9. If not, go to step 10.

GO TO NEXT PAGE

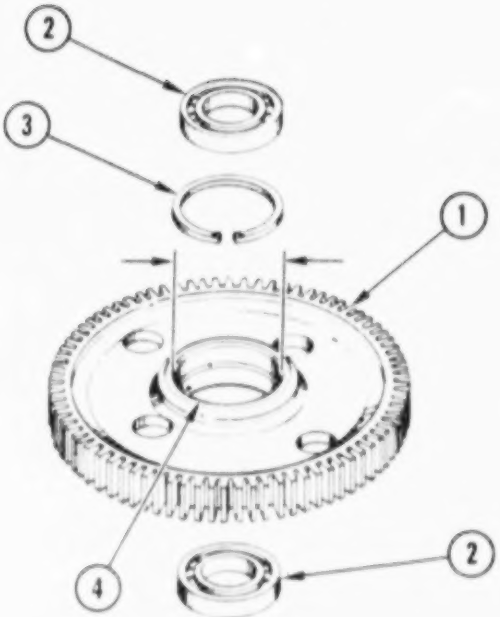
9. CHECK GEAR (1).

   a. Using mechanical puller kit, remove and discard two bearings (2).

   b. Using retaining-ring pliers (Item 61), remove retaining ring (3).

   c. Using telescoping gage set and micrometer caliper set, measure bearing bore (4).

   d. Replace gear (1) if measurement is greater than 3.1495 inches (79.997mm).



10. CLEAN POWER TAKEOFF ASSEMBLY.

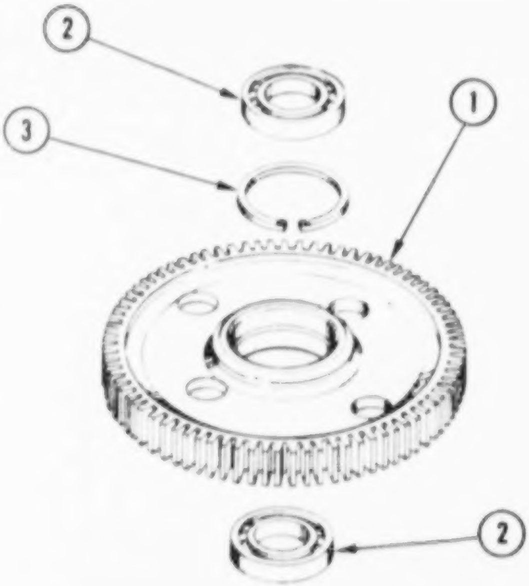
    a. Clean assembly and hardware. See page 2-2,

11. INSPECT POWER TAKEOFF ASSEMBLY.

    a. Inspect assembly, piece parts, and inserts. See page 2-5.

    b. Repair inserts if damaged. See task REPAIR POWER TAKEOFF HOUSING INSERTS, page 4-148.

ASSEMBLE

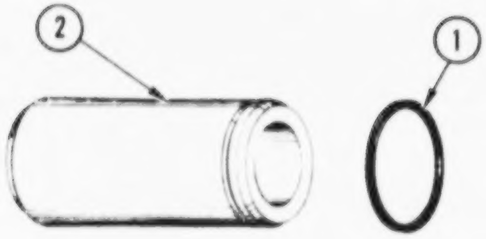


12. IF BEARINGS (2) WERE REMOVED, GO TO STEP 13. IF NOT, GO TO STEP 15.

13. USING RETAINING-RING PLIERS (ITEM 61), INSTALL RETAINING RING (3) IN GEAR (1).

14. PRESS BEARINGS (2) INTO GEAR (1).

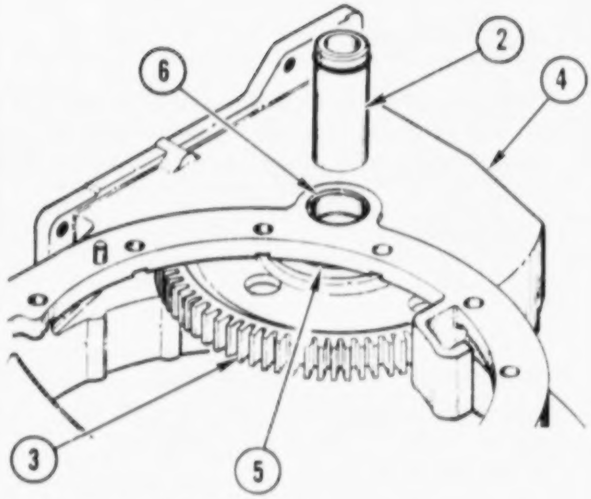
    a. Using arbor press, install bearings (2) in gear (1) so that bearings are seated against retaining ring (3).



15. INSTALL NEW PREFORMED PACKING (1) ON SHAFT (2).

    a. Coat new preformed packing (1) with transmission oil.

    b. Put preformed packing (1) on shaft (2).



16. INSTALL GEAR (3).

    a. Slide gear (3) into housing (4).

    b. Aline center hole of bearings (5) with shaft hole (6).

    c. Install shaft (2).

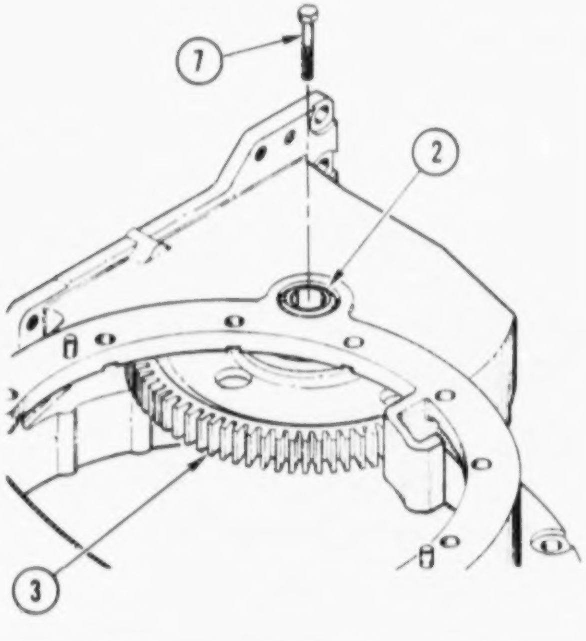
17. SECURE SHAFT (2).

    a. Coat threads of bolt (7) with sealant compound and install bolt.

18. USING 3/8-INCH DRIVE TORQUE WRENCH WITH ADAPTER, TORQUE BOLT (7) TO 110-135 in-lb (127-155 cmkg).

19. ROTATE GEAR (3) TO BE SURE IT MOVES FREELY.

    a. If gear (3) moves freely, go to END OF TASK. If not, go to step 1.



END OF TASK

REPAIR POWER TAKEOFF HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the power takeoff housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Socket wrench set — (Item 89, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

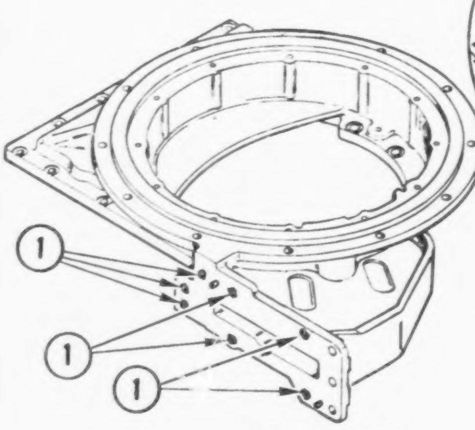
Personnel Required:

- Track Veh Rep 63H10

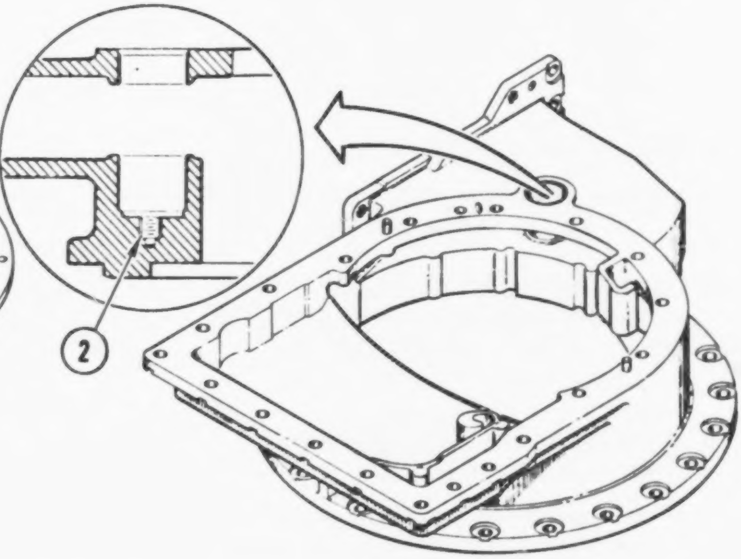
Equipment Conditions:

- Power takeoff housing on workbench. See page 4-144.

REPAIR



FRONT VIEW



REAR VIEW

STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD / OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installa-tion Depth Below Surface
1	M45932/1-23L SR376L	SR37R		SR37T	RZA12788-4 RZA12656-4	.128-.138 in. 3.25-3.51 mm	SR37WA	.035-.045 in. .889-1.14 mm
	M45932/3-23L SRW376L	SRW37R	SRW37D	SRW37T	RZA12789-4 RZA12791-4	.128-.138 in. 3.25-3.51 mm	SR37WA	.035-.045 in. .889-1.14 mm
2	M45932/1-15L SR250L	SR25R		SR25T	RZA12788-2 RZA12656-2	.082-.092 in. 2.08-2.34 mm	SR25WA	.02-.03 in. .51-.76 mm
	M45932/3-15L SRW250L	SRW25R	SRW25D	SRW25T	RZA12789-2 RZA12791-2	.082-.092 in. 2.08-2.34 mm	SR25WA	.02-.03 in. .51-.76 mm

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END OF TASK

Section V. MAIN HOUSING ASSEMBLY

TASK INDEX

Task	Page	Task	Page
Repair Main Housing Inserts	4-150	Clean Main Housing Assembly	4-155

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPAIR MAIN HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the main housing. Part or item numbers of tools, kits and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

General mechanic's tool kit: automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inside/outside indicator caliper — (Item 41, App C)
Portable electric drill — (Item 58, App C)
Screw threading set — (Item 65, App C)
Socket wrench set — (Item 88, App C)
Socket wrench set — (Item 89, App C)
Transmission insert repair kit — (Item 103, App C)
Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)

Personnel Required:
Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

NOTE

Early transmissions have some threaded holes with no inserts. Later transmissions have threaded inserts.

REPAIR

STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. 2.08-2.34 mm	SR19WA	.02-.03 in. .51-.76 mm
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. 2.08-2.34 mm	SR19WA	.02-.03 in. .51-.76 mm
2	M45932/1-17L SR314L	SR31R		SR31T	RZA12788-3 RZA12656-3	.097-.107 in. 2.46-2.72 mm	SR31WA	.035-.045 in. 1.02-1.14 mm
	M45932/3-17L SRW314L	SRW31R	SRW31D	SRW31T	RZA12789-3 RZA12791-3	.097-.107 in. 2.46-2.72 mm	SR31WA	.035-.045 in. .889-1.14 mm

STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION (Continued)

<table>
<tr><th>Index No.</th><th>Insert No. STANDARD OVERSIZE</th><th>Removal Tool No.</th><th>Step Drill No.</th><th>Thread Cutting Tap Tool No.</th><th>Swage Tool No. With Swage Tool Stop No.</th><th>Counter-bore Depth</th><th>Drive Wrench No.</th><th>Installation Depth Below Surface</th></tr>
<tr><td>3</td><td>M45932/1-21L
SR374L</td><td>SR37R</td><td></td><td>SR37T</td><td>RZA12788-4
RZA12656-4</td><td>.128-.138 in.
(3.25-3.51 mm)</td><td>SR37WA</td><td>.035-.045 in.
(.889-1.14 mm)</td></tr>
<tr><td></td><td>M45932/3-21L
SRW374L</td><td>SRW37R</td><td>SRW37D</td><td>SRW37T</td><td>RZA12789-4
RZA12791-4</td><td>.128-.138 in.
(3.25-3.51 mm)</td><td>SR37WA</td><td>.035-.045 in.
(.889-1.14 mm)</td></tr>
<tr><td>3A</td><td>M45932/1-27L
SR434L</td><td>SR43R</td><td></td><td>SR43T</td><td>RZA12788-5
RZA12656-5</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR43W4A</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td></td><td>M45932/3-27L
SRW434L</td><td>SRW43R</td><td>SRW43D</td><td>SRW43T</td><td>RZA12789-5
RZA12791-5</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR43W4A</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td>4</td><td>M45932/1-13L
SR258L</td><td>SR25R</td><td></td><td>SR25T</td><td>RZA12788-2
RZA12656-2</td><td>.082-.092 in.
(2.08-2.34 mm)</td><td>SR25WA</td><td>.02-.03 in.
(.51-.76 mm)</td></tr>
<tr><td></td><td>M45932/3-13L
SRW258L</td><td>SRW25R</td><td>SRW25D</td><td>SRW25T</td><td>RZA12789-2
RZA12791-2</td><td>.082-.092 in.
(2.08-2.34 mm)</td><td>SR25WA</td><td>.02-.03 in.
(.51-.76 mm)</td></tr>
<tr><td>5</td><td>M45932/1-28
SR434</td><td>SR43R</td><td></td><td>SR43T</td><td>RZA12788-5
RZA12656-5</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR43W4A</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td></td><td>M45932/3-28
SRW434</td><td>SRW43R</td><td>SRW43D</td><td>SRW43T</td><td>RZA12789-5
RZA12791-5</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR43W4A</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td colspan="9">CAUTION
Inserts M45932/1-29L and SRW500L must be supported from the rear when swaging insert. Damage to housing can occur.</td></tr>
<tr><td>6</td><td>M45932/1-29L
SR500L</td><td>SR50R</td><td></td><td>SR50T</td><td>RZA12788-6
RZA12656-6</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR50WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td></td><td>M45932/3-29L
SRW500L</td><td>SRW50R</td><td>SRW500</td><td>SRW50T</td><td>RZA12789-6
RZA12791-6</td><td>.138-.148 in.
(3.51-3.76 mm)</td><td>SR50WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td>7</td><td>M45932/1-37L
SR628L</td><td>SR628R</td><td></td><td>SR62T</td><td>RZA12788-7
RZA12656-7</td><td>.181-.191 in.
(4.60-4.85 mm)</td><td>SR62WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td></td><td>M45932/3-37L
SRW628L</td><td>SRW628R</td><td>SRW62D</td><td>SRW62T</td><td>RZA12789-7
RZA12791-7</td><td>.181-.191 in.
(4.60-4.85 mm)</td><td>SR62WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td>8</td><td>M45932/1-24
SR376</td><td>SR37R</td><td></td><td>SR37T</td><td>RZA12788-4
RZA12656-4</td><td>.128-.138 in.
(3.25-3.51 mm)</td><td>SR37W4A</td><td>.035-.045 in.
(.889-1.14 mm)</td></tr>
<tr><td></td><td>M45932/3-24
SRW376</td><td>SRW37R</td><td>SRW37D</td><td>SRW37T</td><td>RZA12789-4
RZA12791-4</td><td>.128-.138 in.
(3.25-3.51 mm)</td><td>SR37W4A</td><td>.035-.045 in.
(.889-1.14 mm)</td></tr>
<tr><td>9</td><td>M45932/1-39L
SR621L</td><td>SR621R</td><td></td><td>SR62T</td><td>RZA12788-7
RZA12656-7</td><td>.181-.191 in.
(4.60-4.85 mm)</td><td>SR62WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
<tr><td></td><td>M45932/3-39L
SRW621L</td><td>SRW621R</td><td>SRW62D</td><td>SRW62T</td><td>RZA12789-7
RZA12656-7</td><td>.181-.191 in.
(4.60-4.85 mm)</td><td>SR62WA</td><td>.045-.055 in.
(1.14-1.40 mm)</td></tr>
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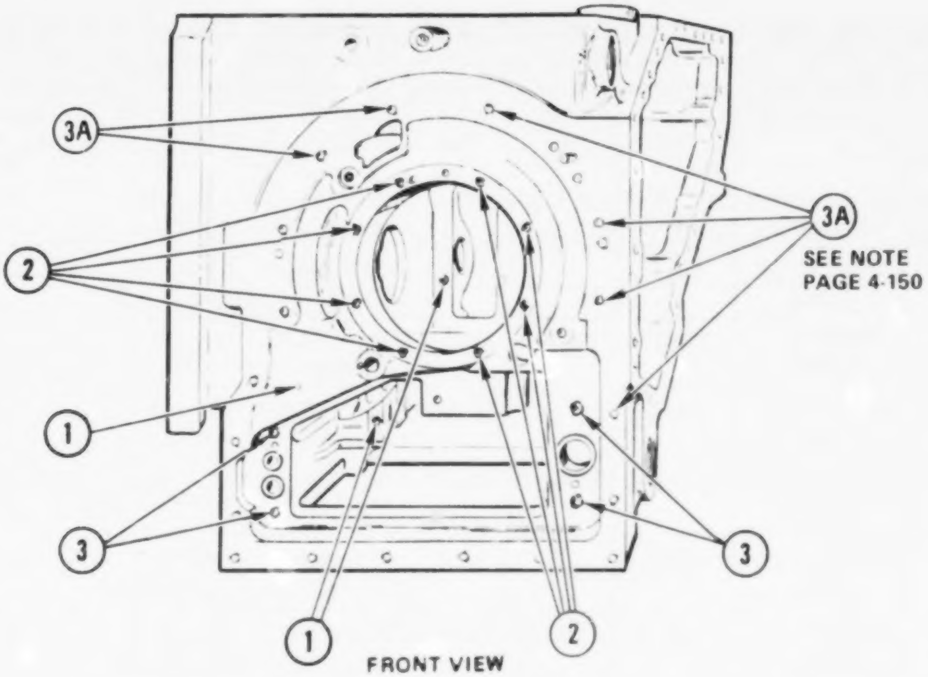
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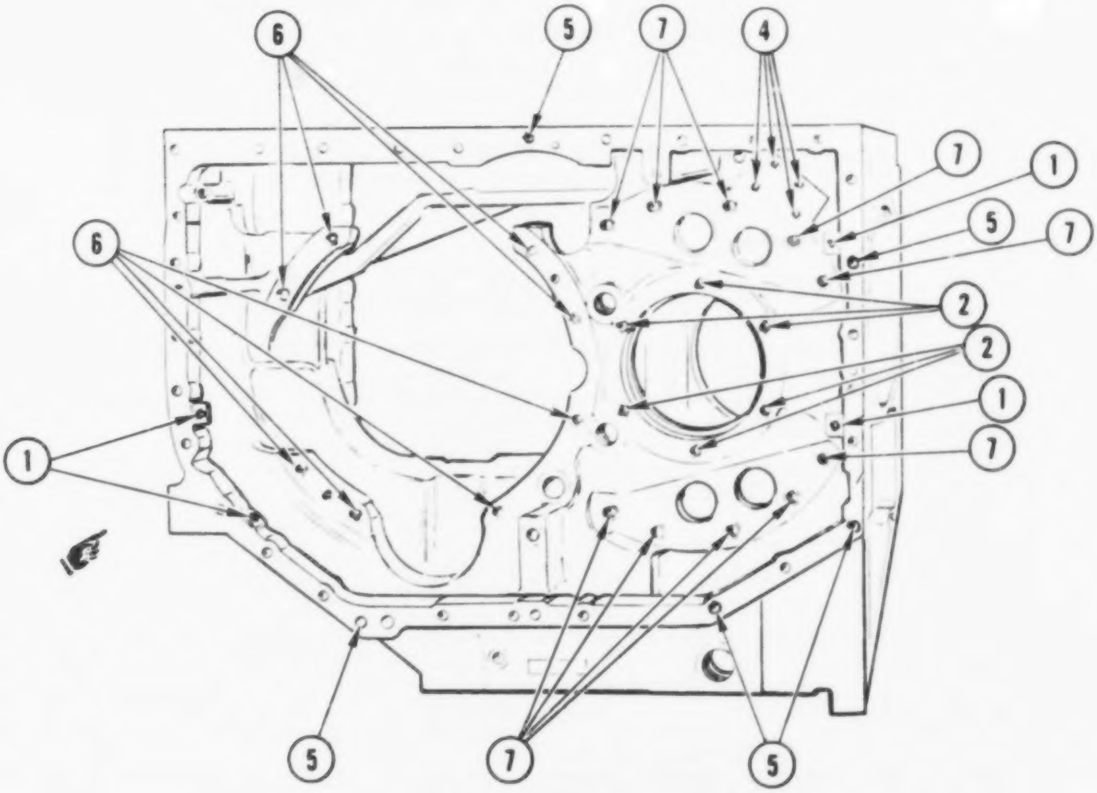
FRONT VIEW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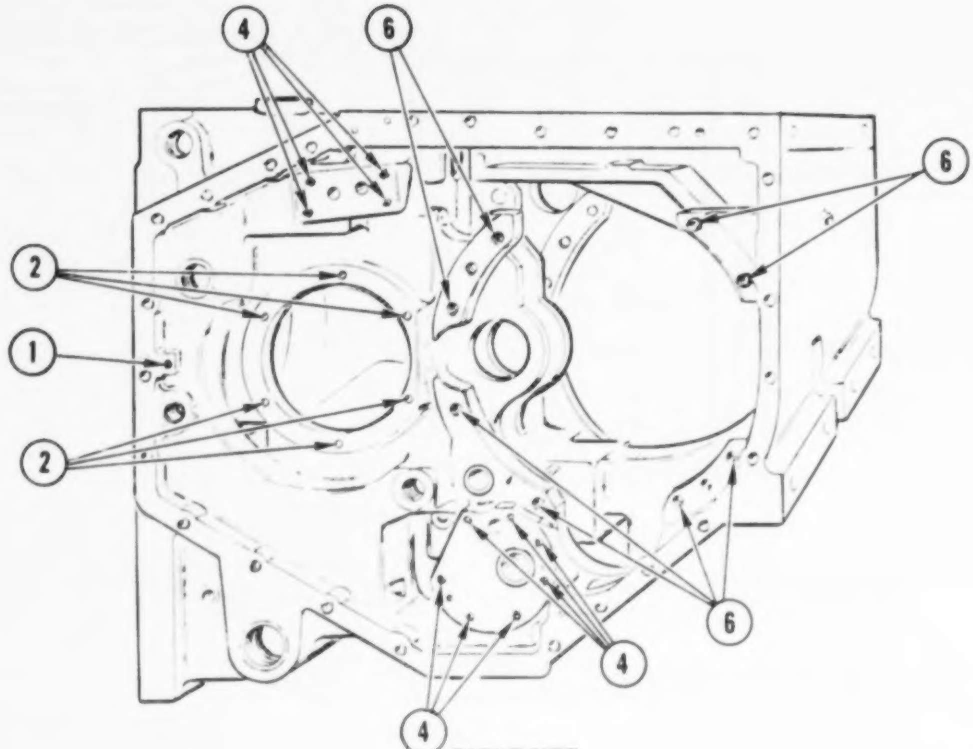
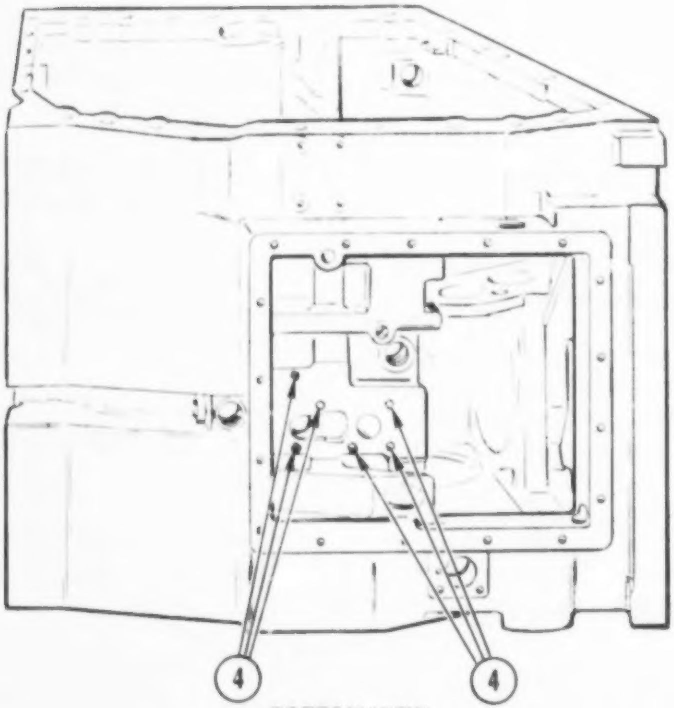
LEFT SIDE



RIGHT SIDE



BOTTOM VIEW

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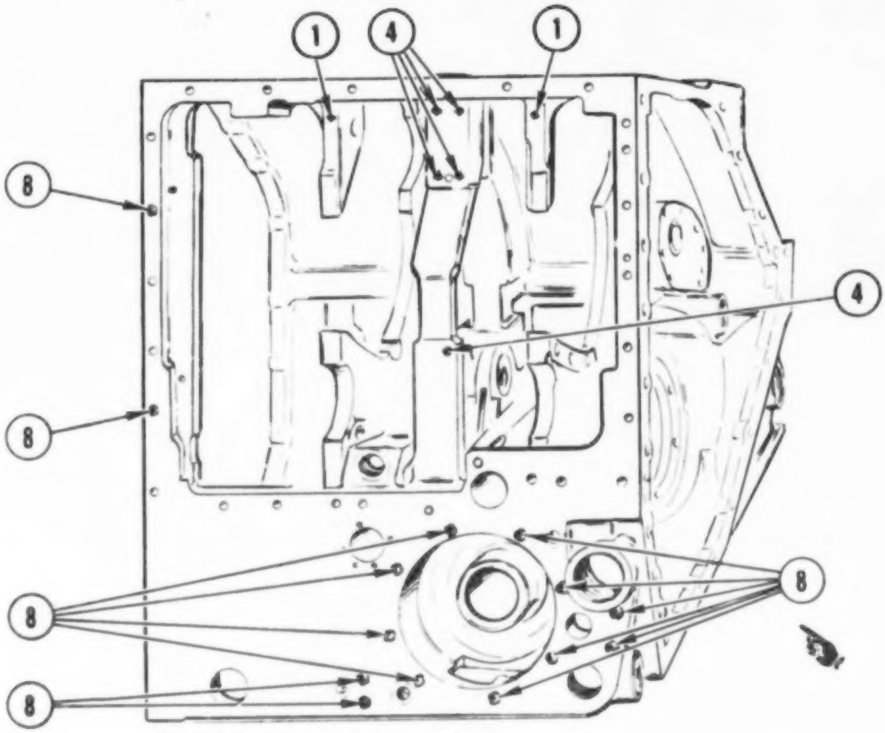
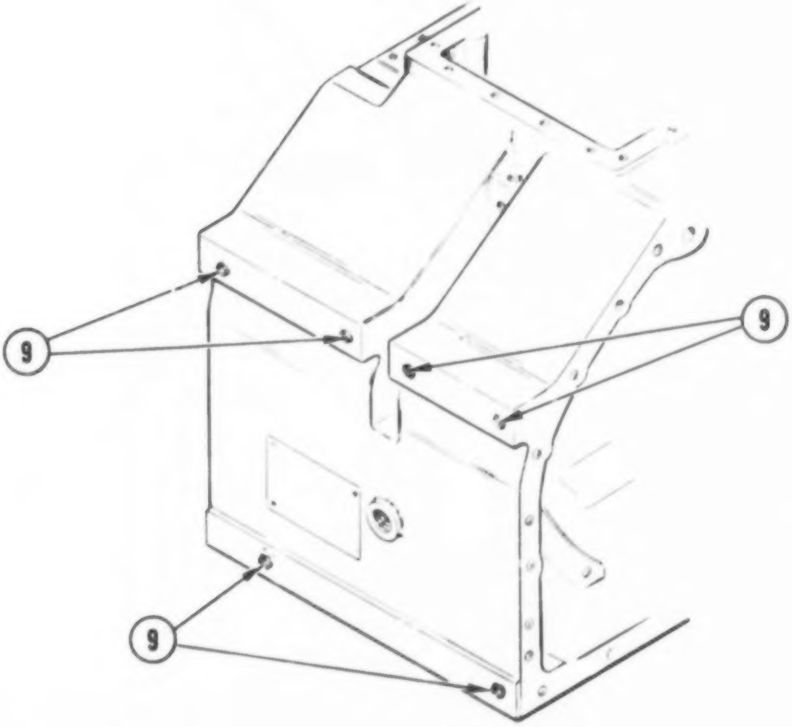


TOP VIEW



REAR VIEW

END OF TASK

CLEAN MAIN HOUSING ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-155). Clean (page 4-157). Assemble (page 4-166).

INITIAL SETUP

Tools:

- Cleanout housing repair kit — (Item 19, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Hex-drive key set — (Item 35, App C)
- Industrial goggles — (Item 39, App C)
- Socket wrench set — (Item 87, App C)
- Compressed air source, filtered, 30 psi (207 kPa) maximum

Materials/Parts:

- Flushing hose — (Item 4A, App B)

Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Transmission mounted on tip-over stand. See page 2-144.

DISASSEMBLE

1. REMOVE OIL FILTER COVER ASSEMBLY. See task REPLACE OIL FILTER COVER ASSEMBLY, page 3-18.

2. REMOVE PRIORITY VALVE PISTON. See task REPLACE PRIORITY VALVE PISTON, page 4-61.

3. REMOVE PRESSURE RELIEF VALVE. See task REPLACE PRESSURE RELIEF VALVE, page 4-65.

4. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

5. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

6. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

7. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

8. REMOVE HOSE ASSEMBLIES 11627588-14 AND 11628453-6. See task REPLACE HOSES AND PLUGS, page 4-2.

9. REMOVE AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

10. REMOVE MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.

11. REMOVE COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.

12. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

GO TO NEXT PAGE

13. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

14. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

15. REMOVE TOW PUMP ASSEMBLY. See task REPLACE TOW PUMP ASSEMBLY, page 4-470.

16. REMOVE THIRD RANGE RELAY VALVE ASSEMBLY. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.

17. REMOVE HOSE ASSEMBLY 11627588-15. See task REPLACE HOSES AND PLUGS, page 4-2.

18. REMOVE HOSE ASSEMBLY 11628453-7. See task REPLACE HOSES AND PLUGS, page 4-2.

19. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

20. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

21. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

22. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

23. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

24. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

25. REMOVE HOSE ASSEMBLY 11629168-5. See task REPLACE HOSES AND PLUGS, page 4-2.

26. REMOVE HOSE ASSEMBLIES 11628453-3, 11629168-6, AND 11629168-9. See task REPLACE HOSES AND PLUGS, page 4-2.

27. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.

28. REMOVE FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.

29. REMOVE HOSE ASSEMBLIES 11629168-7 AND 11629168-2. See task REPLACE HOSES AND PLUGS, page 4-2.

30. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

31. REMOVE LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.

32. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

33. REMOVE HOSE ASSEMBLY 11627588-11. See task REPLACE HOSES AND PLUGS, page 4-2.

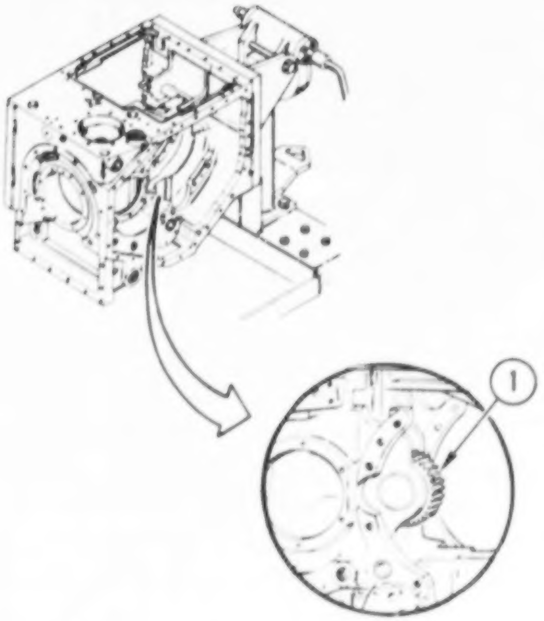
34. REMOVE PLUGS 11627748-23, 11627748-25, 11627748-27, AND 11627748-29. See task REPLACE HOSES AND PLUGS, page 4-2.

35. REMOVE PLUGS 11627748-21, 11627748-23, 11627748-27, 11627748-28, AND 11627748-29. See task REPLACE HOSES AND PLUGS, page 4-2.

36. REMOVE PLUGS 11627748-21 AND 11627748-28. See task REPLACE HOSES AND PLUGS, page 4-2.

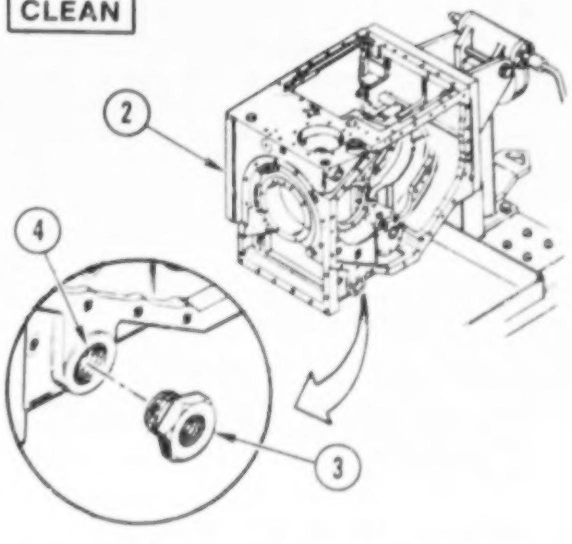
37. REMOVE PLUGS 11627748-25 AND 11627748-27. See task REPLACE HOSES AND PLUGS, page 4-2.

38. REMOVE PLUGS 11627748-23, 11627748-25, 11627748-28 AND MS51840-23. See task REPLACE HOSES AND PLUGS, page 4-2.



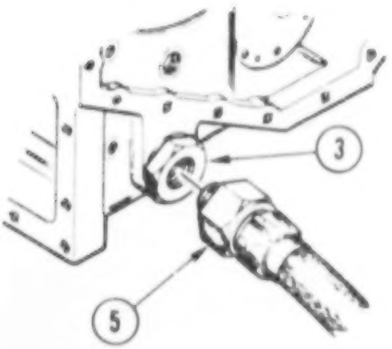
39. CHECK SPUR GEAR (1) FOR FREE SMOOTH ROTATION.
   a. If gear (1) does not rotate freely, remove gear. See task REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

CLEAN

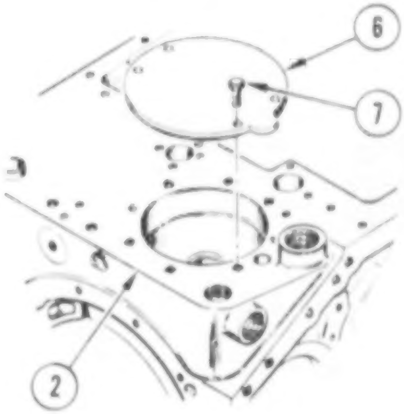


40. TURN TRANSMISSION MAIN HOUSING (2) SO TOP OF HOUSING IS UP.

41. WORKING ON RIGHT SIDE OF HOUSING (2), INSTALL ADAPTER (3) IN COOLANT OUTLET OPENING (4).
   a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, install adapter (3).



42. INSTALL FLUSHING HOSE (5) ON ADAPTER (3).



43. INSTALL FILTER OPENING COVER (6) ON TOP OF HOUSING (2).
   a. Place cover (6) on housing (2).
   b. Install four screws (7).
   c. Hand tighten screws (7).

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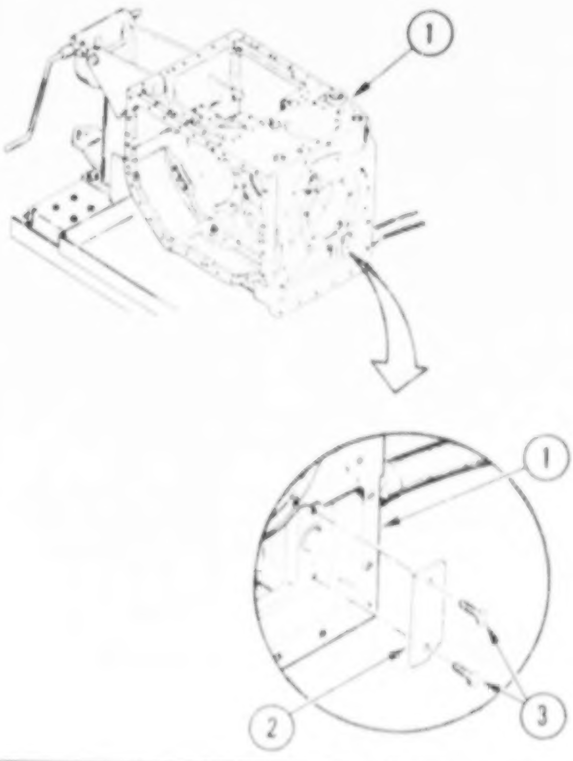
WARNING

Water under pressure can injure you and others. Stand clear of housing. Always wear goggles.

NOTE

The main housing will require five flushings. Make sure all are performed.

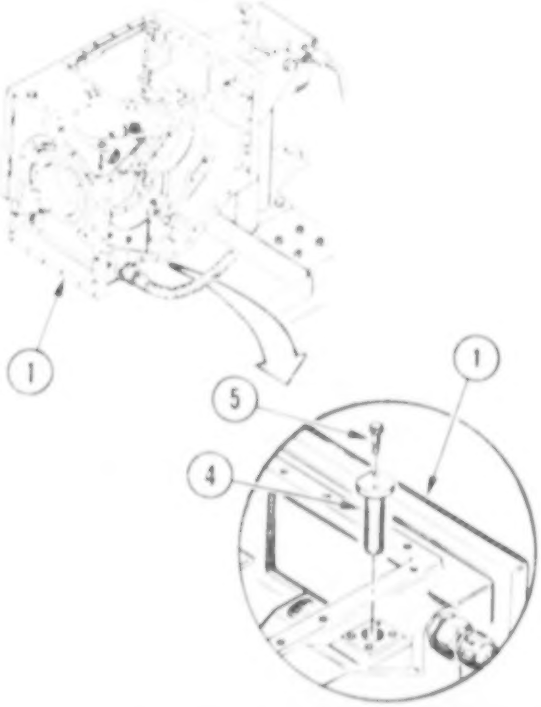


44. FLUSH HOUSING (1) WITH CLEAN WATER AT 40-100 psi (263.8-659.5 kPa) AND 200 gpm (757 lpm) FOR FIVE MINUTES.

45. WORKING ON FRONT OF HOUSING (1), INSTALL MAKE-UP PUMP OUTLET COVER (2).
    a. Place cover (2) on housing (1).
    b. Install two screws (3).
    c. Hand tighten screws (3).

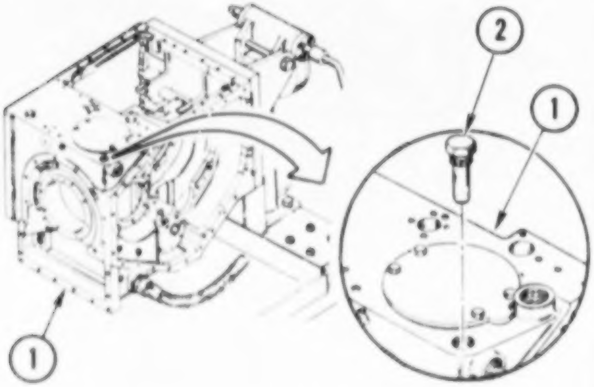
WARNING

Water under pressure can injure you and others. Stand clear of housing. Always wear goggles.

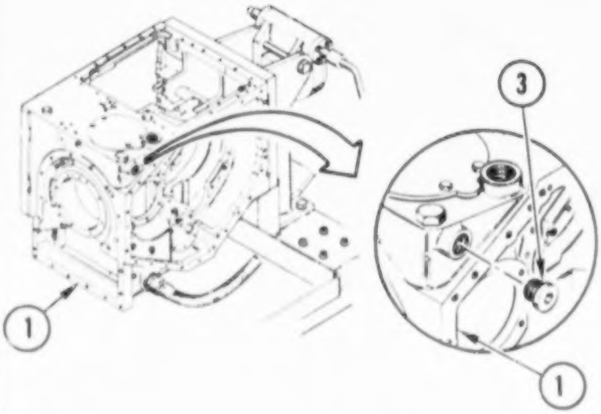


46. FLUSH HOUSING (1) WITH CLEAN WATER AT 40-100 psi (263.8-659.5 kPa) AND 200 gpm (757 lpm) FOR FIVE MINUTES.

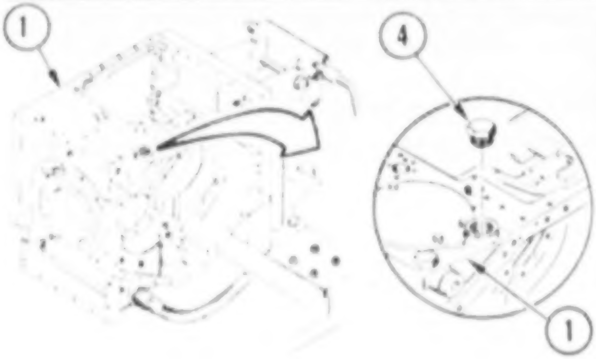
47. WORKING ON BOTTOM OF HOUSING (1), INSTALL REGULATOR COVER (4).
    a. Place cover (4) in housing (1).
    b. Install two screws (5).
    c. Hand tighten screws (5).



48. WORKING ON TOP OF HOUSING (1), INSTALL RELIEF COOLER BY-PASS COVER (2).
    a. Using 1-inch drive ratchet handle and 1 3/4-inch socket, install cover (2) in housing (1).



49. WORKING ON RIGHT SIDE OF HOUSING (1), INSTALL PLUG (3).
    a. Using 5/8-inch hex key, install plug (3) in housing (1).

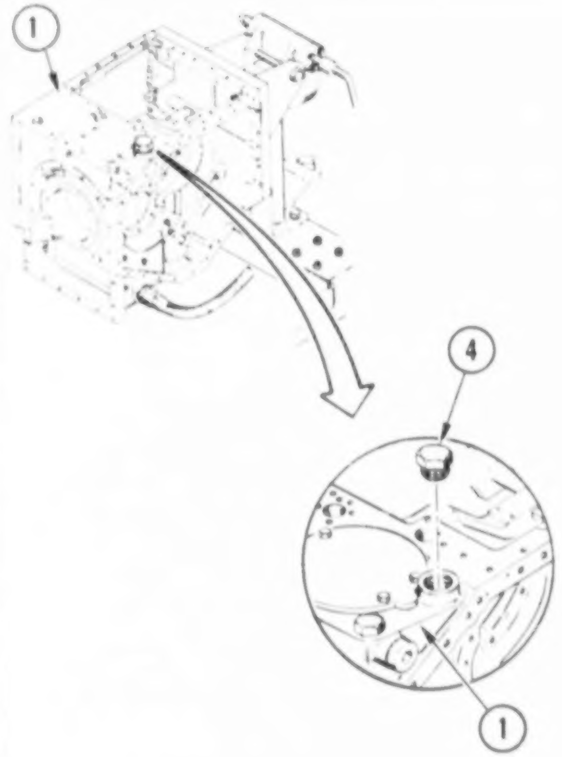


50. WORKING ON TOP OF HOUSING (1), INSTALL PLUG (4).
    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, install plug (4) in housing (1).

WARNING

Water under pressure can injure you and others. Stand clear of housing. Always wear goggles.

51. FLUSH HOUSING (1) WITH CLEAN WATER AT 40-100 psi (263.8-659.5 kPa) AND 200 gpm (757 lpm) FOR FIVE MINUTES.



52. REMOVE PLUG (4).
    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, remove plug (4) from housing (1).

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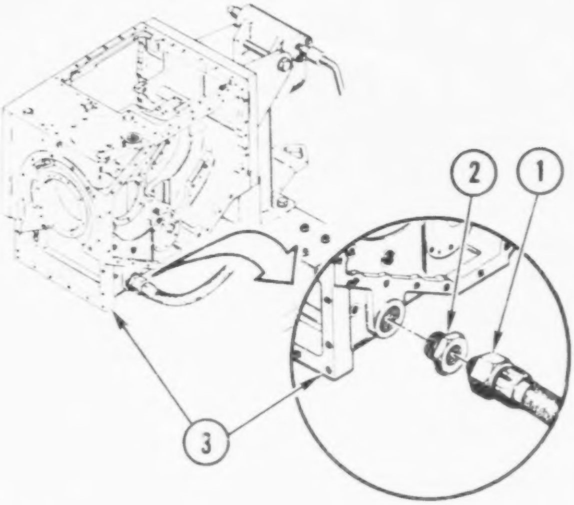
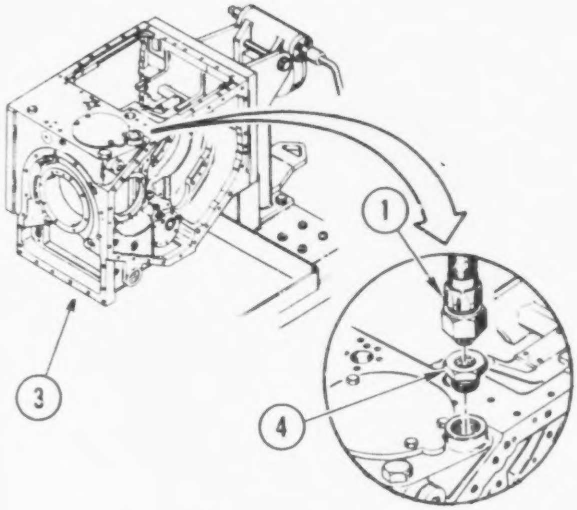


53. REMOVE FLUSHING HOSE (1) FROM ADAPTER (2).

54. REMOVE ADAPTER (2).

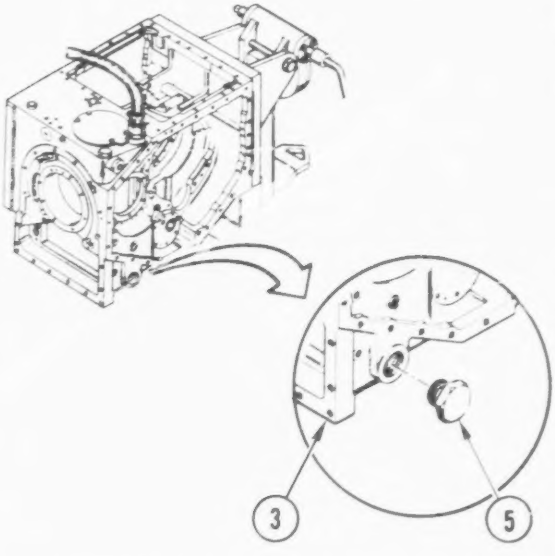
    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, remove adapter (2) from housing (3).



55. INSTALL ADAPTER (4) IN TOP OF HOUSING (3).

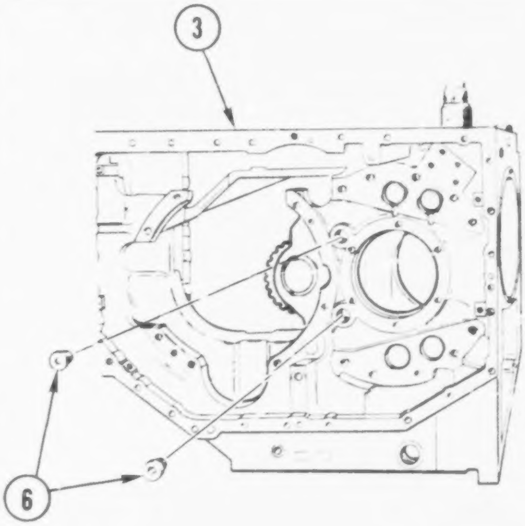
    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, install adapter (4) in housing (3).

56. INSTALL FLUSHING HOSE (1).



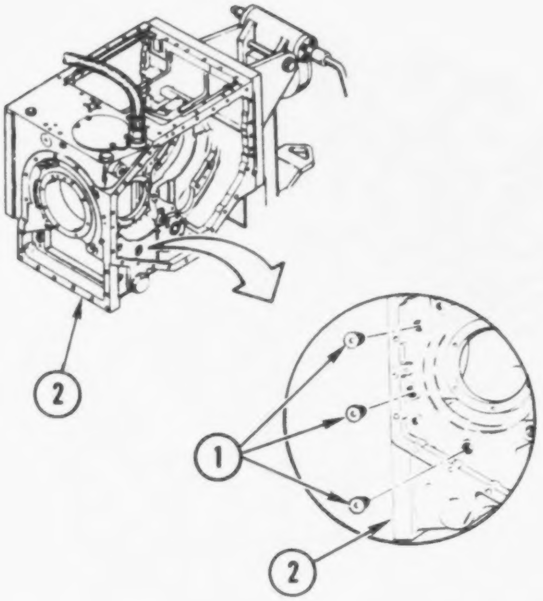
57. WORKING ON RIGHT SIDE OF HOUSING (3), INSTALL PLUG (5).

    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, install plug (5) in housing (3).

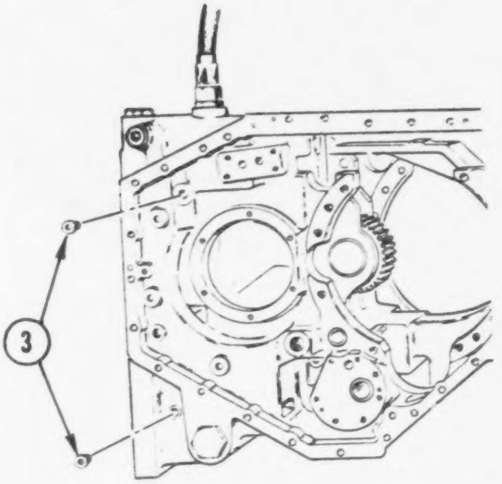


58. WORKING ON LEFT SIDE OF HOUSING (3), INSTALL TWO PLUGS (6).

    a. Using 3/8-inch hex key, install two plugs (6) in housing (3).



59. WORKING ON RIGHT SIDE OF HOUSING (2), INSTALL THREE PLUGS (1).
    a. Using 3/8-inch hex key, install three plugs (1) in housing (2).

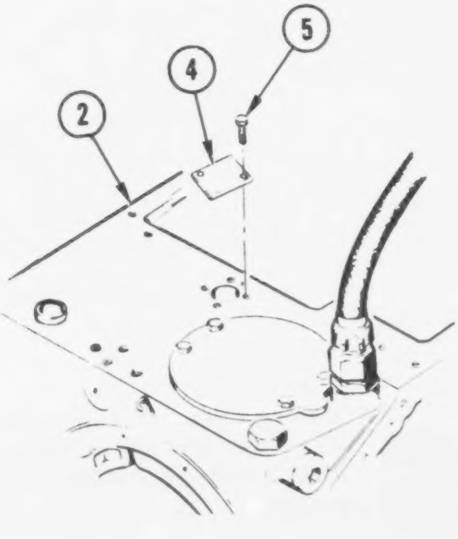


60. INSTALL TWO PLUGS (3).
    a. Using 3/16-inch hex key, install two plugs (3).

WARNING

Water under pressure can injure you and others. Stand clear of housing. Always wear goggles.

61. FLUSH HOUSING (2) WITH CLEAN WATER AT 40-100 psi (263.8-659.5 kPa) AND 200 gpm (757 lpm) FOR FIVE MINUTES.



62. INSTALL PRIORITY VALVE OPENING COVER (4) IN TOP OF HOUSING (2).
    a. Place cover (4) on housing (2).
    b. Install two screws (5).
    c. Hand tighten screws (5).

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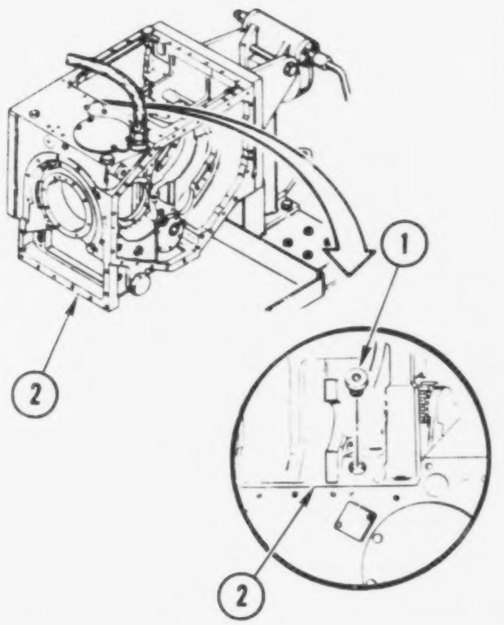
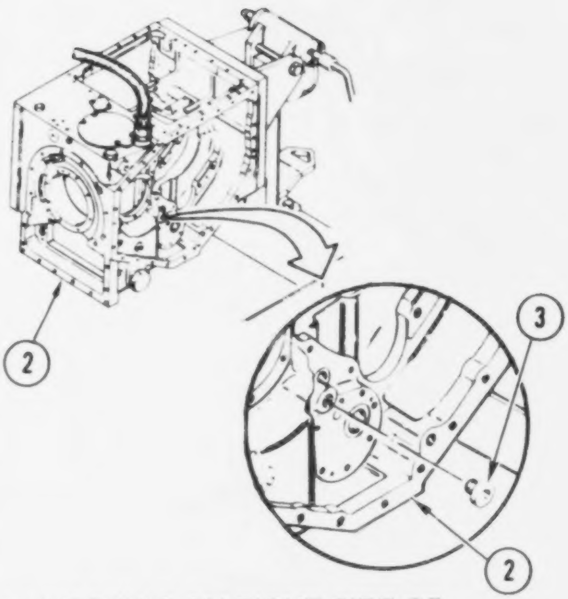
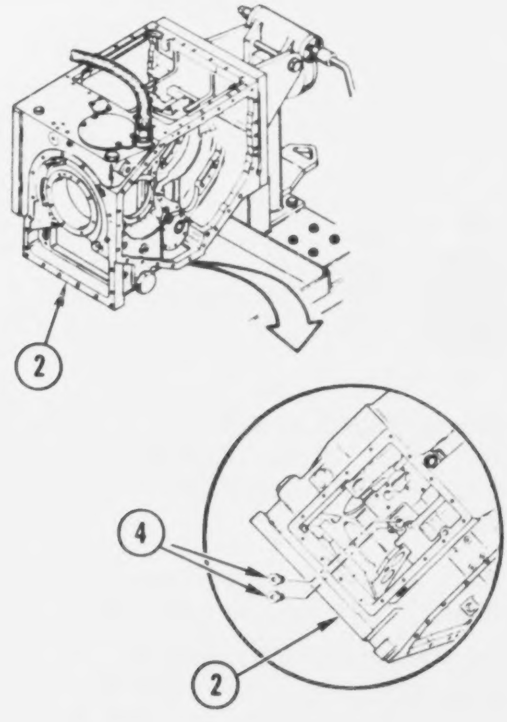


63. INSTALL PLUG (1).
    a. Using 9/16-inch hex key, install plug (1) in housing (2).



64. WORKING ON RIGHT SIDE OF HOUSING (2), INSTALL PLUG (3).
    a. Using 9/16-inch hex key, install plug (3) in housing (2).

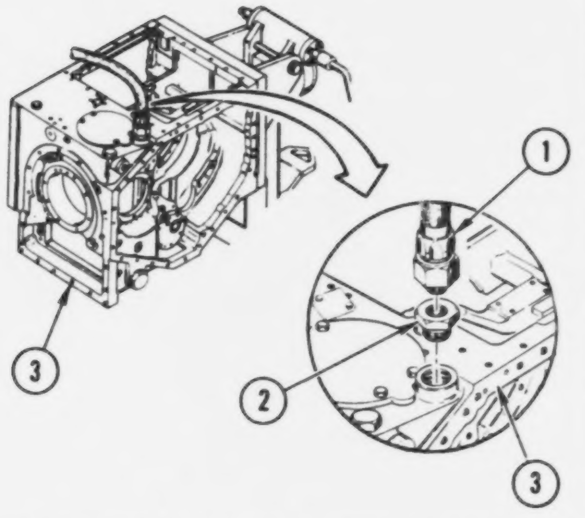
65. WORKING ON BOTTOM OF HOUSING (2), INSTALL TWO PLUGS (4).
    a. Using 9/16-inch hex key, install two plugs (4) in housing (2).



WARNING

Water under pressure can injure you and others. Stand clear of housing. Always wear goggles.

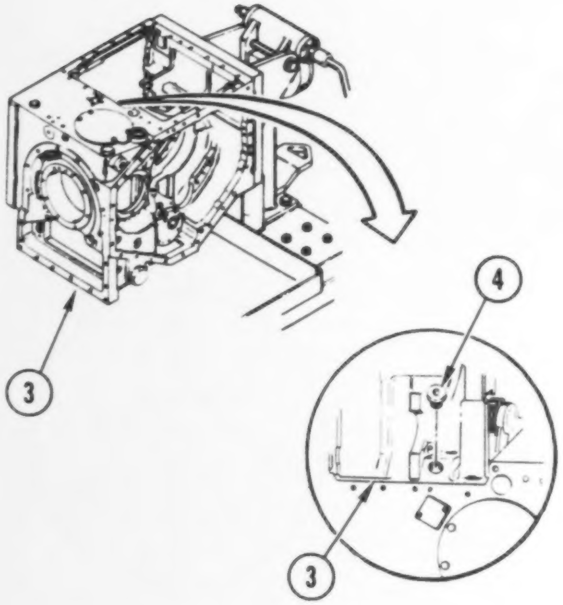
66. FLUSH HOUSING (2) WITH CLEAN WATER AT 40-100 psi (263.8-659.5 kPa) AND 200 gpm (757 lpm) FOR FIVE MINUTES.



67. REMOVE FLUSHING HOSE (1) FROM ADAPTER (2).

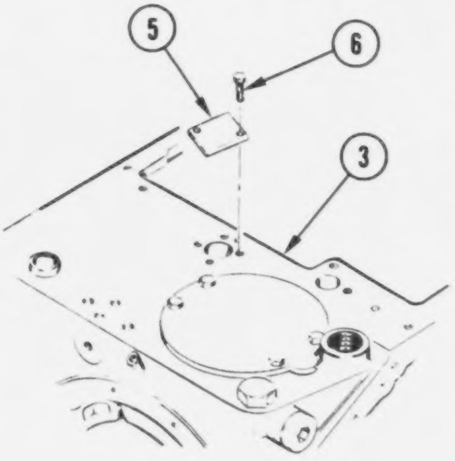
68. REMOVE ADAPTER (2).

    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, remove adapter (2) from housing (3).



69. REMOVE PLUG (4) FROM TOP OF HOUSING (3).

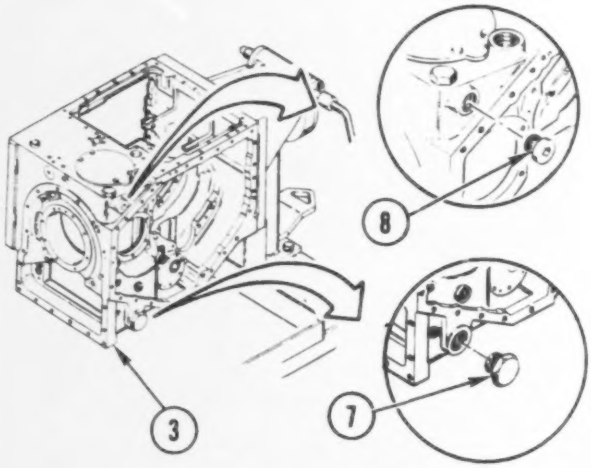
    a. Using 9/16-inch hex key, remove plug (4).



70. REMOVE COVER (5) FROM TOP OF HOUSING (3).

    a. Remove two screws (6).

    b. Remove cover (5).



71. WORKING ON RIGHT SIDE OF HOUSING (3), REMOVE PLUG (7).

    a. Using 1-inch drive ratchet handle and 2 1/8-inch socket, remove plug (7).

72. REMOVE PLUG (8).

    a. Using 5/8-inch hex key, remove plug (8).

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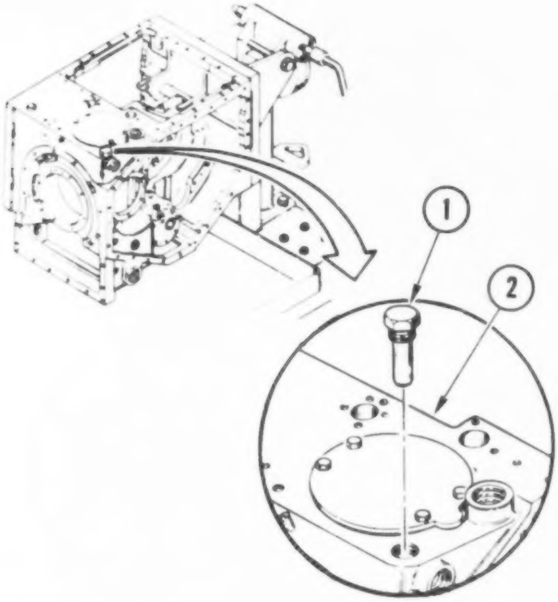
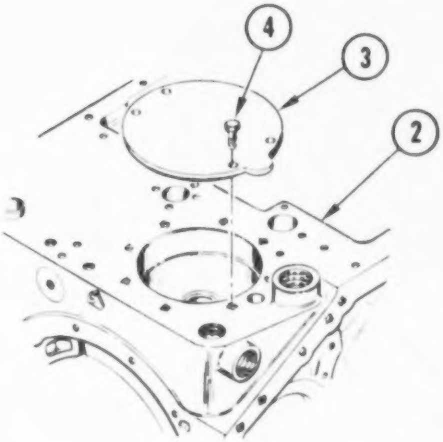


73. REMOVE COVER (1) FROM TOP OF HOUSING (2).

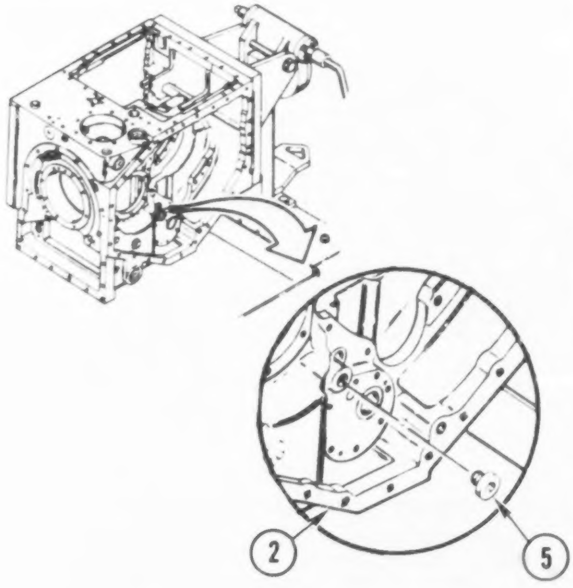
   a. Using 1-inch drive ratchet handle and 1 3/4-inch socket, remove cover (1).



74. REMOVE COVER (3) FROM TOP OF HOUSING (2).

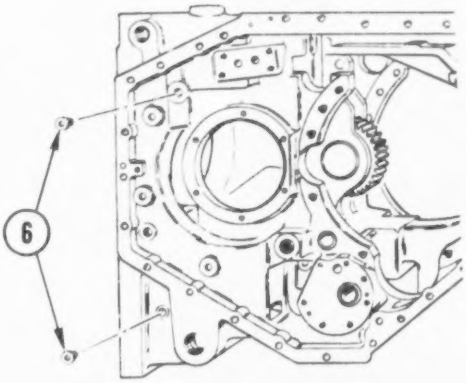
   a. Remove four screws (4).

   b. Remove cover (3).



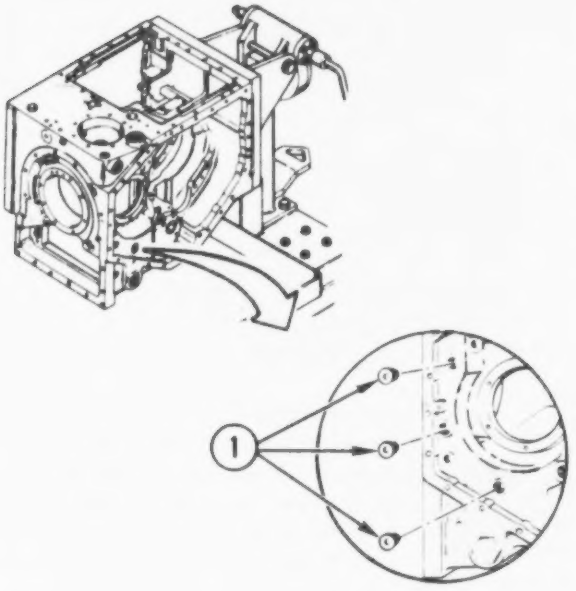
75. WORKING ON RIGHT SIDE OF HOUSING (2), REMOVE PLUG (5).

   a. Using 9/16-inch hex key, remove plug (5).



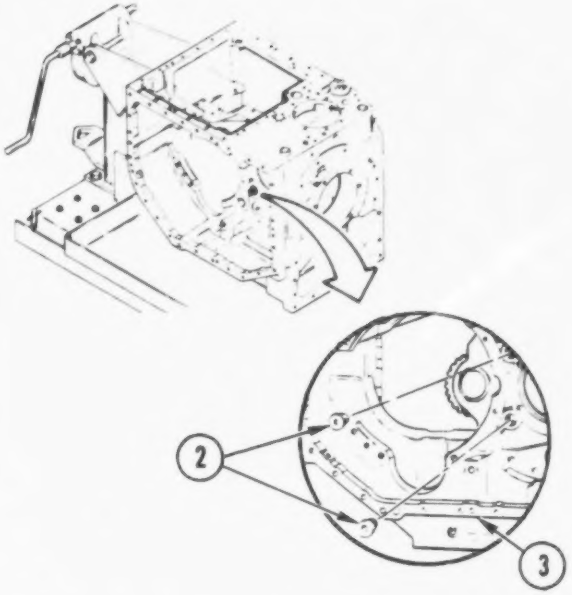
76. REMOVE TWO PLUGS (6).

   a. Using 3/16-inch hex key, remove two plugs (6).



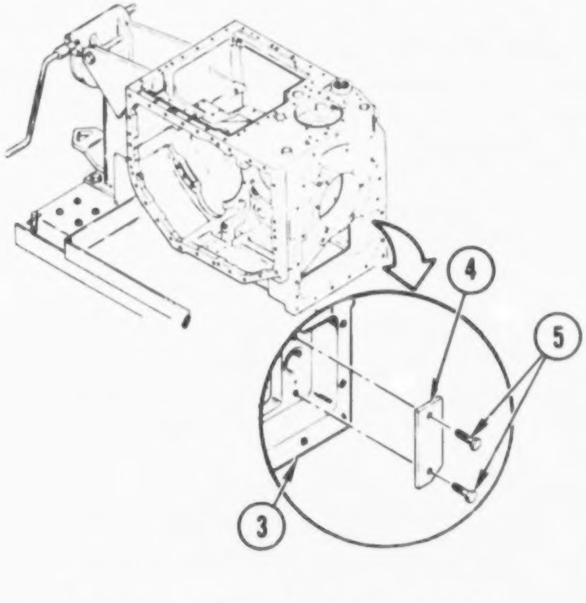
77. REMOVE THREE PLUGS (1).

   a. Using 3/8-inch hex key, remove three plugs (1).



78. WORKING ON LEFT SIDE OF HOUSING (3), REMOVE TWO PLUGS (2).

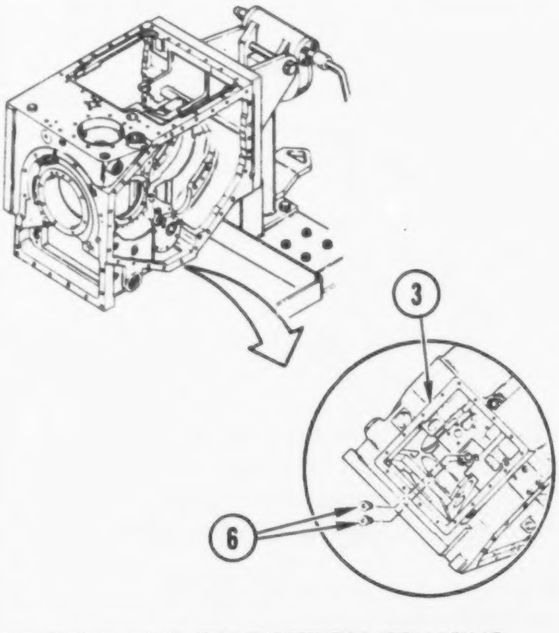
   a. Using 3/8-inch hex key, remove two plugs (2).



79. WORKING ON FRONT OF HOUSING (3), REMOVE COVER (4).

   a. Remove two screws (5).

   b. Remove cover (4).



80. WORKING ON BOTTOM OF HOUSING (3), REMOVE TWO PLUGS (6).

   a. Using 9/16-inch hex key, remove two plugs (6).

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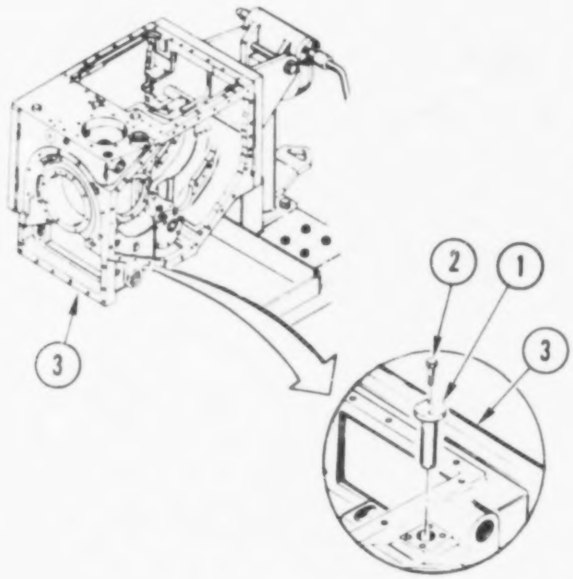
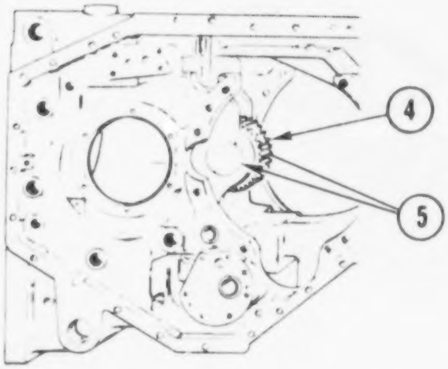


81. REMOVE COVER (1).
    - a. Remove two screws (2).
    - b. Remove cover (1).

82. ROTATE HOUSING (3) ON TIP-OVER STAND TO DRAIN WATER FROM PORTS AND CAVITIES.

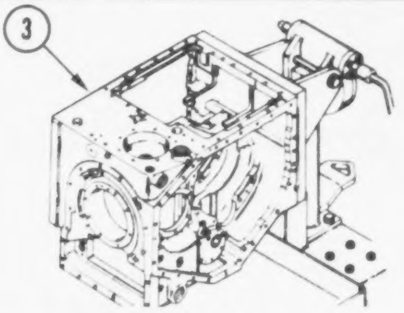


WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 20 psi (207 kPa). Always wear goggles.

83. USING FILTERED LOW PRESSURE AIR, BLOW WATER OUT OF ALL SCREW HOLES, OIL PORTS, AND HOUSING CAVITIES.

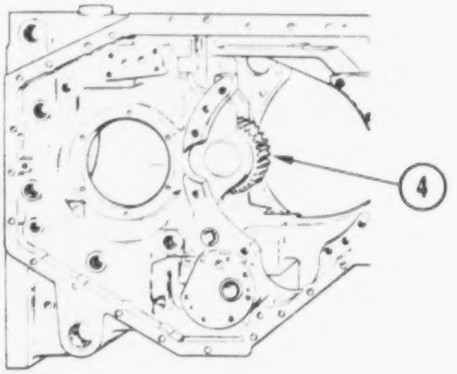
84. IF GEAR (4) IS INSTALLED, LUBRICATE ROLLER BEARINGS (5) WITH TRANSMISSION OIL TO REMOVE ANY WATER.



85. INSPECT HOUSING (3) FOR SCRATCHES ON FINISHED SURFACES OR CRACKS IN HOUSING. REPLACE HOUSING IF DAMAGED.

86. INSPECT ALL MAIN HOUSING INSERTS. See page 2-5.
    - a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

ASSEMBLE



87. IF GEAR (4) WAS REMOVED, INSTALL GEAR. See task REPLACE INPUT IDLER SPUR GEAR ASSEMBLY, page 4-45.

88. INSTALL PLUGS 11627748-23, 11627748-25, 11627748-28 AND MS51840-23. See task REPLACE HOSES AND PLUGS page 4-2.

89. INSTALL PLUGS 11627748-25 AND 11627748-27. See task REPLACE HOSES AND PLUGS, page 4-2.

90. INSTALL PLUGS 11627748-21 AND 11627748-28. See task REPLACE HOSES AND PLUGS, page 4-2.

91. INSTALL PLUGS 11627748-21, 11627748-23, 11627748-27, 11627748-28, AND 11627748-29. See task REPLACE HOSES AND PLUGS, page 4-2.

92. INSTALL PLUGS 11627748-23, 11627748-25, 11627748-27, AND 11627748-29. See task REPLACE HOSES AND PLUGS, page 4-2.

93. INSTALL HOSE ASSEMBLY 11627588-11. See task REPLACE HOSES AND PLUGS, page 4-2.

94. INSTALL INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

95. INSTALL LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.

96. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

97. INSTALL HOSE ASSEMBLIES 11629168-7 AND 11629168-2. See task REPLACE HOSES AND PLUGS, page 4-2.

98. INSTALL FIRST RANGE RELAY VALVE ASSEMBLY. See task REPLACE FIRST RANGE RELAY VALVE ASSEMBLY, page 4-418.

99. INSTALL SECOND RANGE RELAY VALVE ASSEMBLY. See task REPLACE SECOND RANGE RELAY VALVE ASSEMBLY, page 4-514.

100. INSTALL HOSE ASSEMBLIES 11628453-3, 11629168-6, AND 11629168-9. See task REPLACE HOSES AND PLUGS, page 4-2.

101. INSTALL HOSE ASSEMBLY 11629168-5. See task REPLACE HOSES AND PLUGS, page 4-2.

102. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

103. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

104. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

105. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

106. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

107. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

108. INSTALL HOSE ASSEMBLY 11628453-7. See task REPLACE HOSES AND PLUGS, page 4-2.

109. INSTALL HOSE ASSEMBLY 11627588-15. See task REPLACE HOSES AND PLUGS, page 4-2.

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110. INSTALL THIRD RANGE RELAY VALVE ASSEMBLY. See task REPLACE THIRD RANGE RELAY VALVE ASSEMBLY, page 4-502.

111. INSTALL TOW PUMP ASSEMBLY. See task REPLACE TOW PUMP ASSEMBLY, page 4-470.

112. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

113. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

114. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

115. INSTALL COOLANT AND TIME DELAY VALVE ASSEMBLY. See task REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-404.

116. INSTALL MAKEUP PUMP FLUID REGULATING VALVE. See task REPLACE MAKEUP PUMP FLUID REGULATING VALVE, page 3-26.

117. INSTALL AUXILIARY MAKEUP PUMP. See task REPLACE AUXILIARY MAKEUP PUMP, page 4-482.

118. INSTALL HOSE ASSEMBLIES 11628453-6 AND 11627588-14. See task REPLACE HOSES AND PLUGS, page 4-2.

119. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

120. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

121. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.

122. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

123. INSTALL PRESSURE RELIEF VALVE. See task REPLACE PRESSURE RELIEF VALVE, page 4-65.

124. INSTALL PRIORITY VALVE PISTON. See task REPLACE PRIORITY VALVE PISTON, page 4-61.

125. INSTALL OIL FILTER COVER ASSEMBLY. See task REPLACE OIL FILTER COVER ASSEMBLY, page 3-18.

END OF TASK

Section VI. RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY

TASK INDEX

Task	Page
Replace Right-Hand Intermediate Housing Assembly	4-170
Repair Right-Hand Intermediate Housing Assembly	4-183
Repair Right-Hand Intermediate Housing Inserts	4-195
Replace Right-Hand Single Disk Brake	4-197
Repair Right-Hand Single Disk Brake	4-202
Replace Friction Clutch	4-208
Repair Friction Clutch	4-211

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-170). Install (page 4-176).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
Crowfoot attachment — (Item 21, App C)
Eye bolt (2) — (Item 27, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Micrometer caliper set — (Item 52, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)
Lifting device and chain with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Wiping rag — (Item 13, App B)
Lockwire — (Item 5, App B)
Petrolatum — (Item 7, App B)
Cross shaft shim kit
Lock washer (3)
Socket head cap screw (3)
Transmission repair kit

Personnel Required:

Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

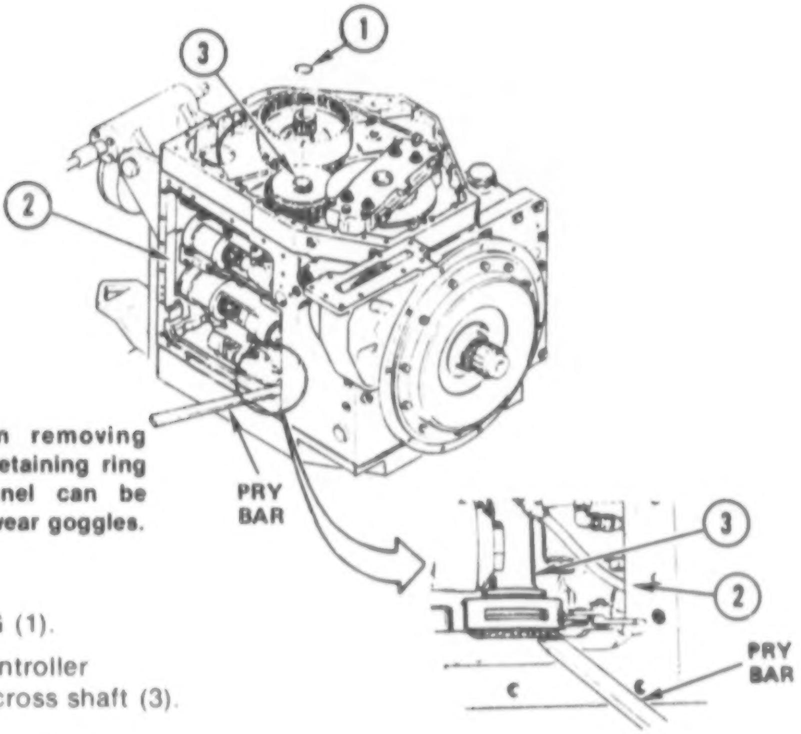
Transmission mounted on tip-over stand. See page 2-144.

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

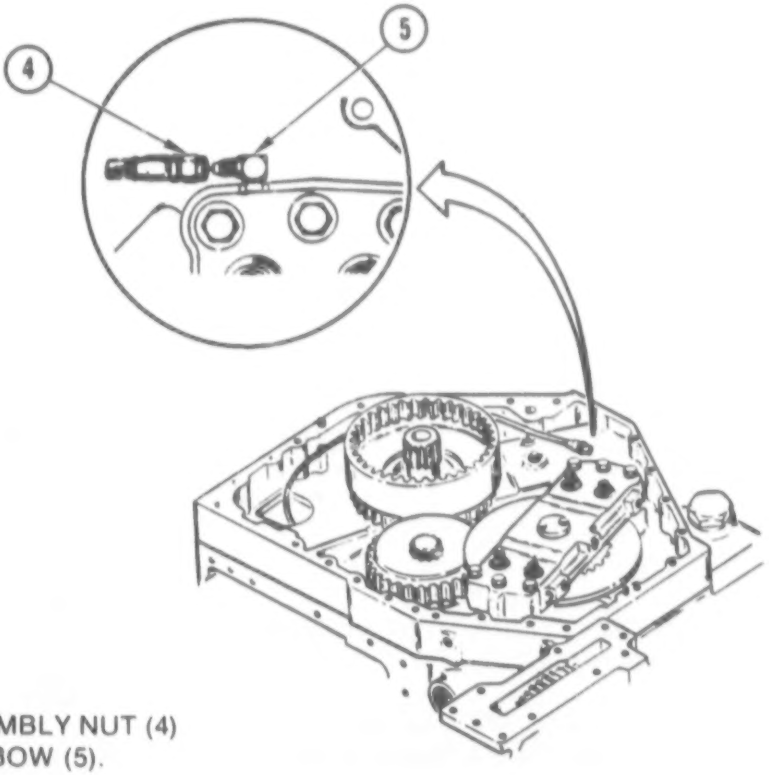
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.



WARNING

Use care when removing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

4. REMOVE RETAINING RING (1).
   a. (H) Reach in through controller opening (2) and pry up cross shaft (3).
   b. Using retaining-ring pliers, remove retaining ring (1).



5. DISCONNECT HOSE ASSEMBLY NUT (4) FROM HOSE TO BOSS ELBOW (5).

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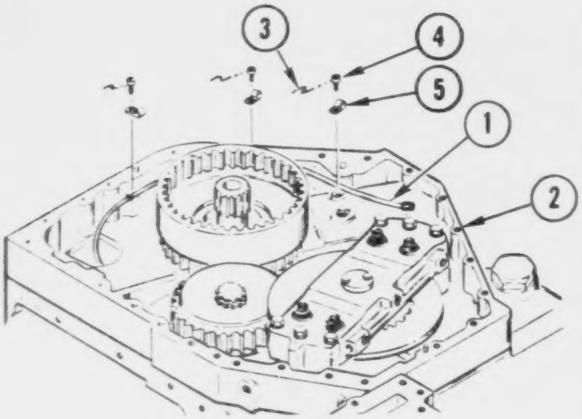
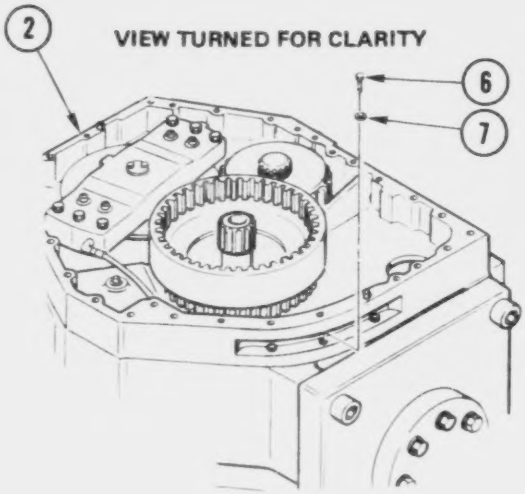


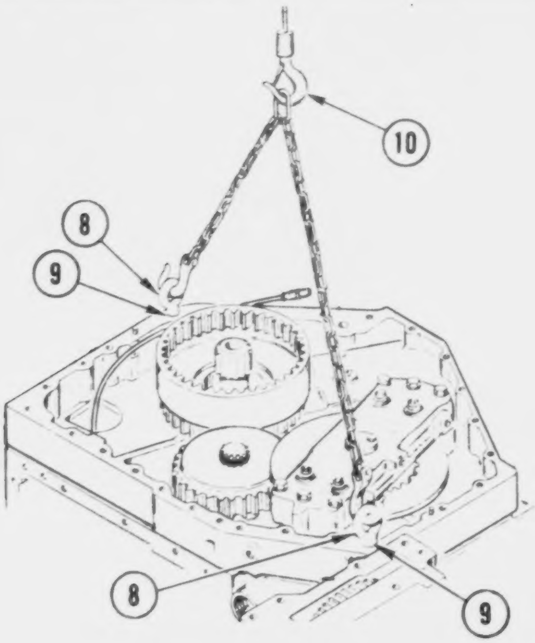
NOTE

Observe how the hose assembly is routed. It must be put back the same way.

6. RELEASE HOSE ASSEMBLY (1) FROM RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY (2).
   a. Using wire-twister pliers, remove and discard lockwire (3) from three screws (4) and clamps (5).
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove three screws (4) and clamps (5). Discard screws.



7. REMOVE THREE SCREWS (6) FROM HOUSING ASSEMBLY (2).
   a. Remove three screws (6) and lock washers (7). Discard lock washers.



8. INSTALL TWO EYEBOLTS (8) IN TWO THREADED HOLES (9).

9. ATTACH AND SECURE LIFTING DEVICE (10) TO TWO EYEBOLTS (8).

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

CAUTION

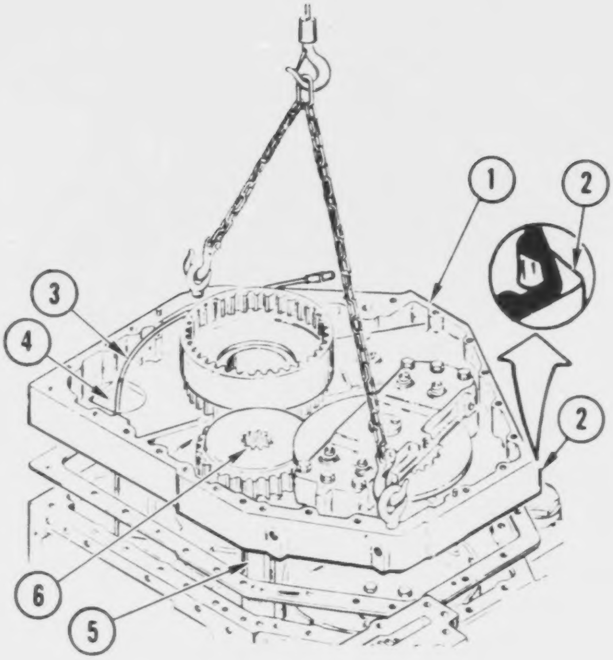
Hose assembly must be fed through opening while lifting housing assembly to prevent damage to hose assembly.

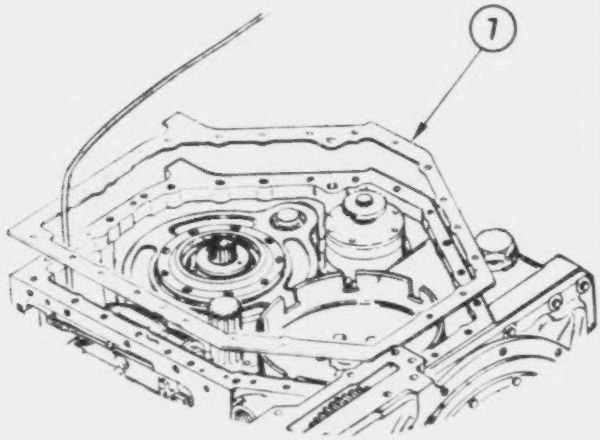
10. EVENLY LIFT OFF HOUSING ASSEMBLY (1).

    a. Use pry slot (2) to loosen housing assembly (1).

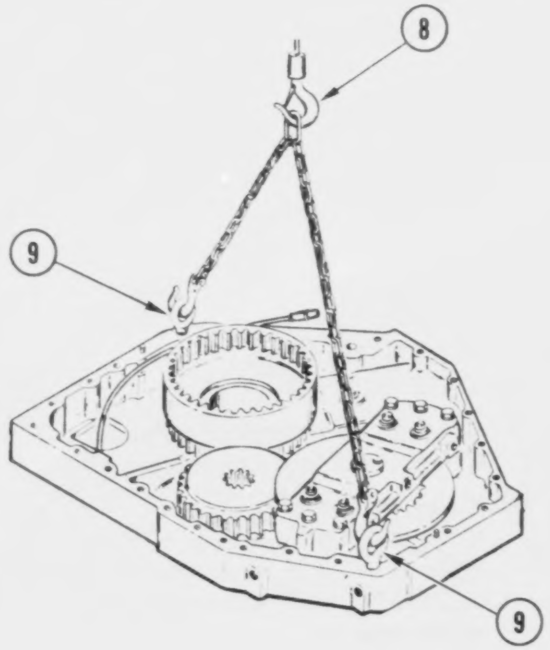
    b. Helper feed hose assembly (3) through opening (4). Repairer lift housing 1/4 inch (6 mm) at a time. Check that cross shaft (5) is not stuck in spur gear (6).

    c. Place housing assembly (1) on workbench.





11. REMOVE AND DISCARD RIGHT-HAND MAIN HOUSING GASKET (7).



12. REMOVE LIFTING DEVICE (8) AND TWO EYEBOLTS (9).

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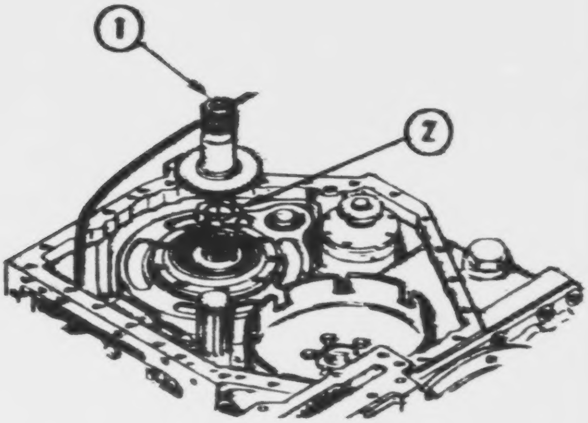
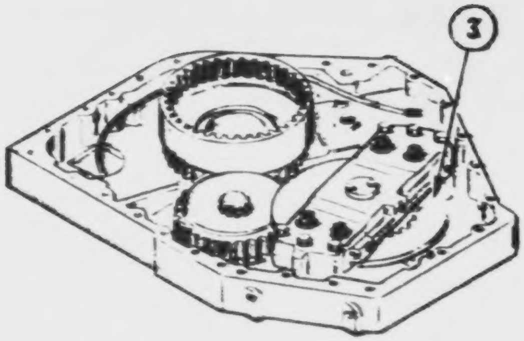


13. REMOVE SPUR GEAR (1) AND THRUST WASHER BEARING (2).

14. INSPECT MAIN HOUSING INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



NOTE

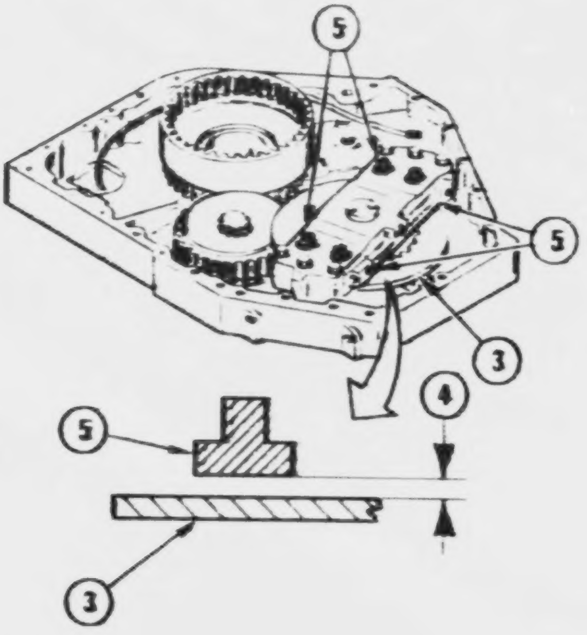
Color changes in pad track area are normal.

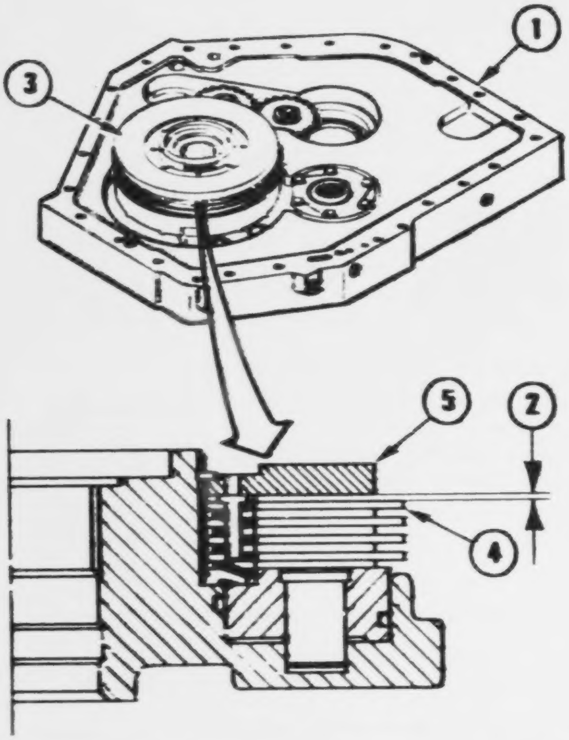
15. INSPECT CLUTCH DISK (3) FOR DAMAGE. See page 2-5.
    a. If surface is damaged, go to step 16. If not, go to step 17.

16. REPLACE RIGHT-HAND SINGLE DISK BRAKE. See page 4-197.

17. CHECK CLEARANCE (4) OF CLUTCH DISK (3).
    a. Measure clearance (4) between clutch disk (3) and four brake pads (5).
    b. If any clearance (4) is not 0.021-0.060 inch (0.53-1.52 mm), go to step 18. If all clearances are 0.021-0.060 inch (0.53-1.52 mm), go to step 19.

18. REPLACE RIGHT-HAND SINGLE DISK BRAKE. See page 4-197.

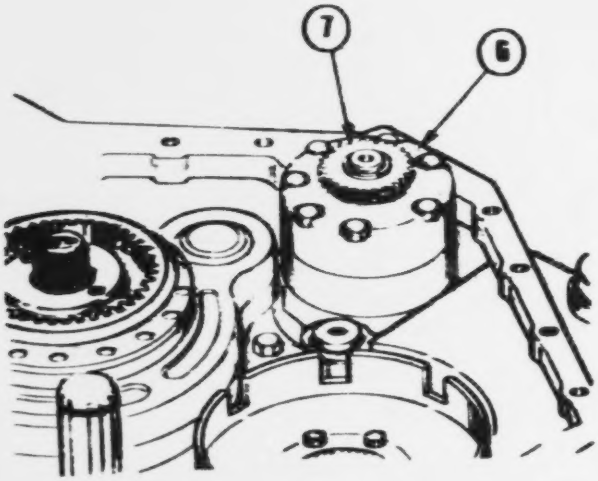




19. REPAIRER AND HELPER, TURN HOUSING ASSEMBLY (1) OVER.

20. CHECK CLEARANCE (2) IN FRICTION CLUTCH (3).
    a. Measure clearance between friction clutch plate (4) and backup plate (5).
    b. If clearance (2) is 0.055-0.085 inch (1.40-2.16 mm), go to step 22. If not, go to step 21.

21. REPLACE FRICTION CLUTCH, page 4-208.



22. INSPECT TOW PUMP ASSEMBLY (6) FOR BINDING.
    a. Rotate spur gear (7) in both directions.
    b. If gear (7) turns easily, go to step 24. If not, go to step 23.

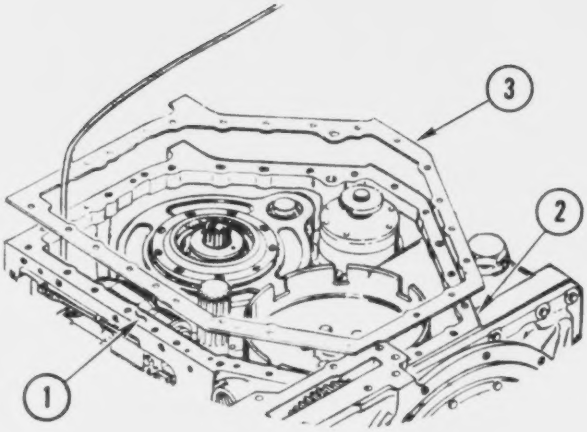
23. REPLACE TOW PUMP ASSEMBLY, page 4-470.

GO TO NEXT PAGE

INSTALL

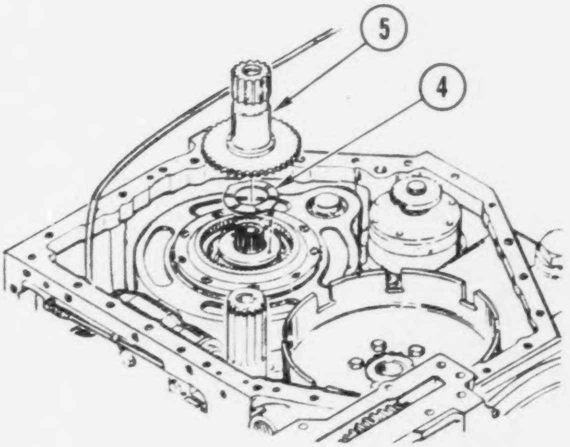
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

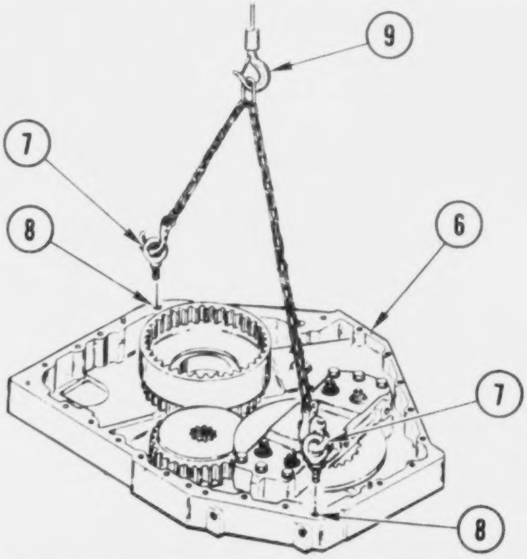


24. CLEAN GASKET MOUNTING SURFACE (1) ON MAIN HOUSING (2).
    a. Use wiping rag dampened with cleaning solvent.

25. INSTALL NEW GASKET (3).
    a. Apply petrolatum to gasket mounting surface (1) on main housing (2).
    b. Install new gasket (3) on main housing (2).



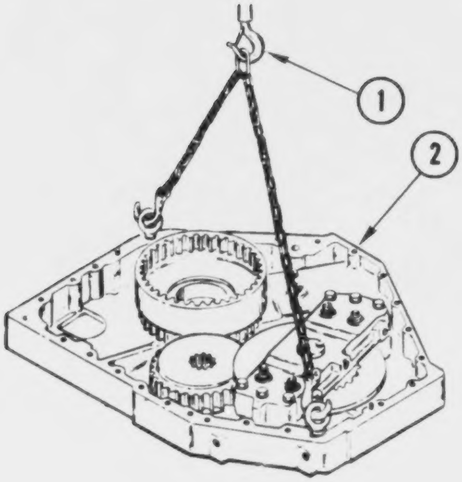
26. INSTALL THRUST WASHER BEARING (4) AND SPUR GEAR (5).



27. REPAIRER AND HELPER, TURN HOUSING ASSEMBLY (6) OVER.

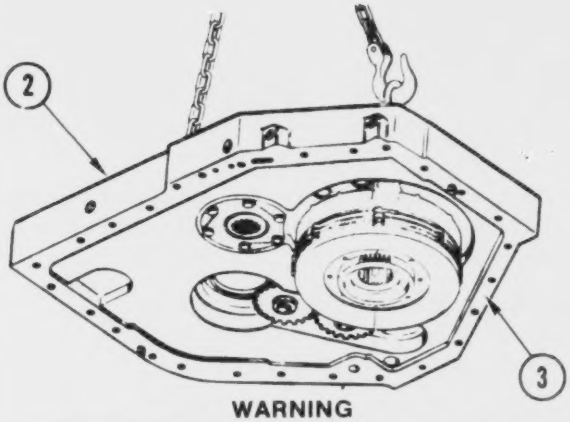
28. INSTALL TWO EYEBOLTS (7) IN THREADED HOLES (8).

29. ATTACH AND SECURE LIFTING DEVICE (9) TO TWO EYEBOLTS (7).



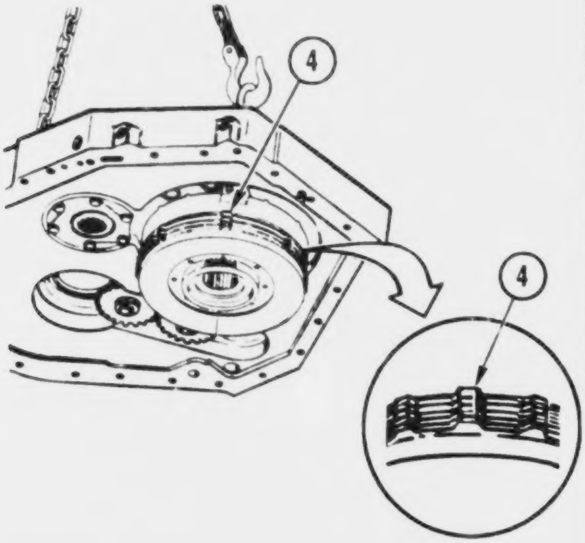
WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

30. USING LIFTING DEVICE (1), LIFT HOUSING ASSEMBLY (2).

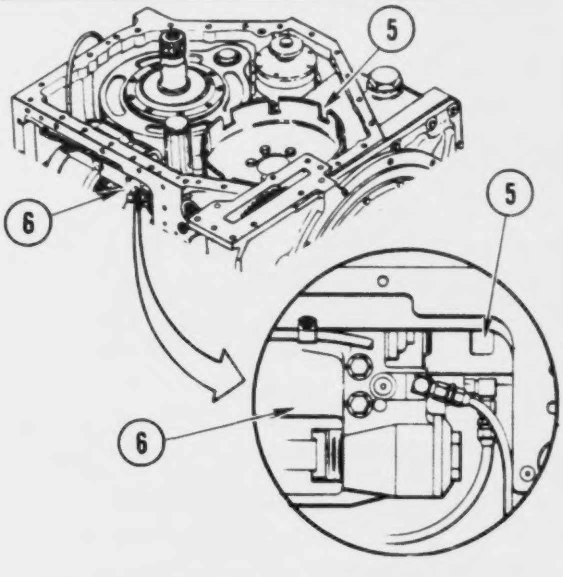


WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

31. CLEAN GASKET MOUNTING SURFACE (3) ON HOUSING ASSEMBLY (2).
    a. Use wiping rag dampened with cleaning solvent.



32. ALINE CLUTCH PLATE TANGS (4).
    a. Turn clutch plate tangs (4) until alined with each other.



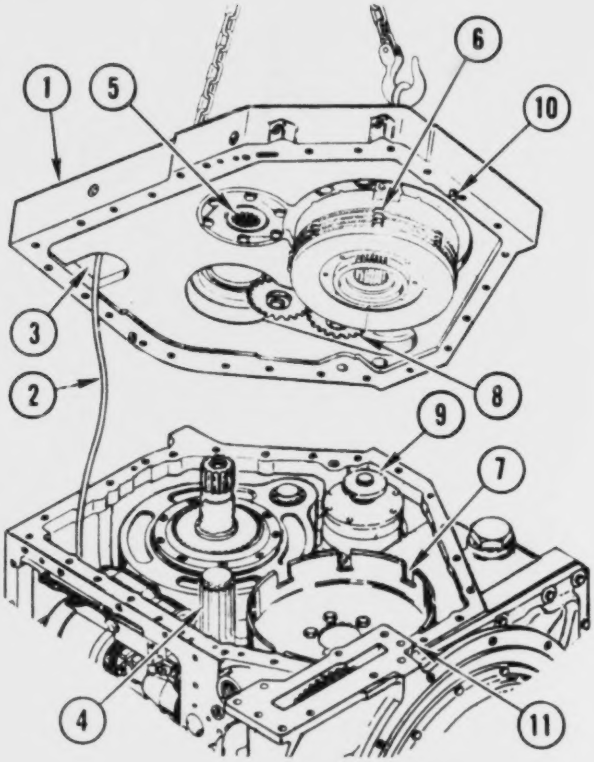
33. ALINE THIRD RANGE CLUTCH HOUSING (5).
    a. Aline slots in clutch housing (5) so one slot can be viewed through top opening (6).

GO TO NEXT PAGE

CAUTION

All parts must mate. Do not allow kinking or bending of hose assembly. Equipment can be damaged.

34. PARTIALLY LOWER HOUSING ASSEMBLY (1) TO ALINE COMPONENTS AND HOSE.
    a. (H) Feed hose (2) through hole (3). Hold hose while lowering housing assembly (1).
    b. Aline shaft (4) with splined hole (5).
    c. Aline clutch plate tangs (6) with slots in clutch housing (7).
    d. Aline tow pump spur gear (8) with spur gear (9).
    e. Aline two pins (10) with pilot holes (11).



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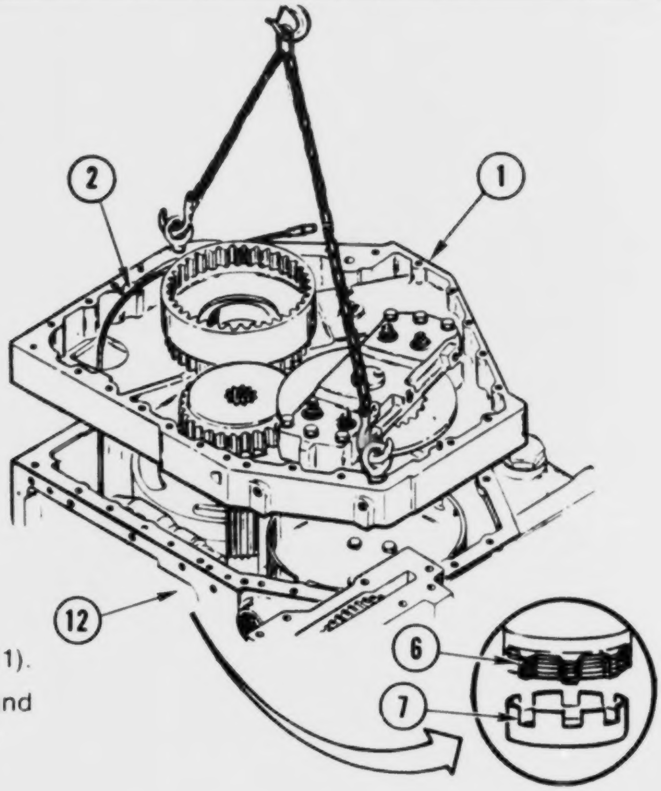
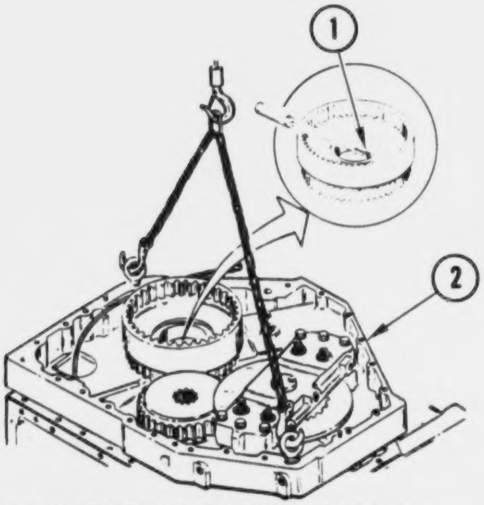
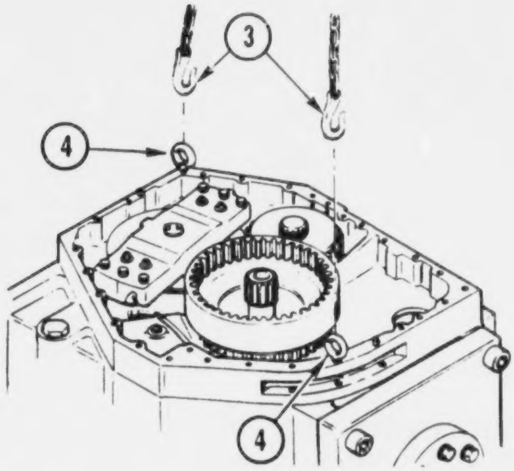
35. LOWER HOUSING ASSEMBLY (1) TO WITHIN 1/4-INCH OF BEING FULLY SEATED.
    a. (H) Hold hose (2) while lowering housing assembly (1).
    b. Aline all parts of housing assembly (1).
    c. (H) Look through top opening (12) and check that clutch plate tangs (6) are alined with clutch housing slots (7).

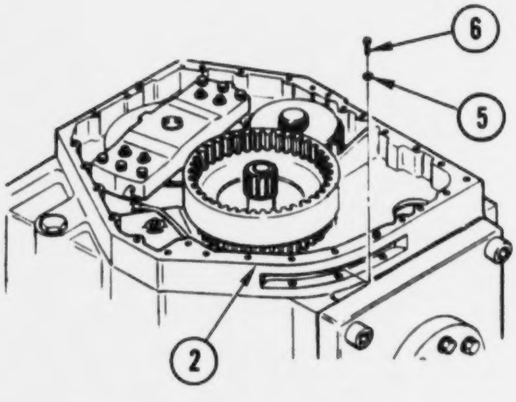




36. TURN TOW PUMP SPUR GEAR (1).
    - a. Using screwdriver, turn tow pump spur gear (1) until right-hand intermediate housing assembly (2) drops into place.
    - b. (H) Lower housing assembly (2).

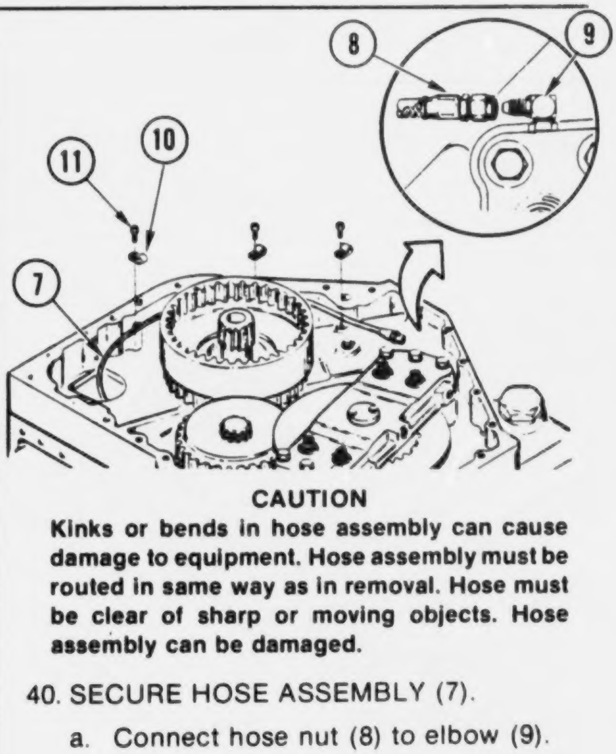


37. REMOVE LIFTING DEVICE (3) AND EYEBOLTS (4).



38. SECURE HOUSING ASSEMBLY (2)
    - a. Install three new lock washers (5) and screws (6).

39. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/8-INCH CROWFOOT, TORQUE THREE SCREWS (6) TO 40-45 ft-lb (6 mkg).



CAUTION

Kinks or bends in hose assembly can cause damage to equipment. Hose assembly must be routed in same way as in removal. Hose must be clear of sharp or moving objects. Hose assembly can be damaged.

40. SECURE HOSE ASSEMBLY (7).
    - a. Connect hose nut (8) to elbow (9).
    - b. Install three clamps (10) and three new screws (11).
    - c. Position hose assembly (7).

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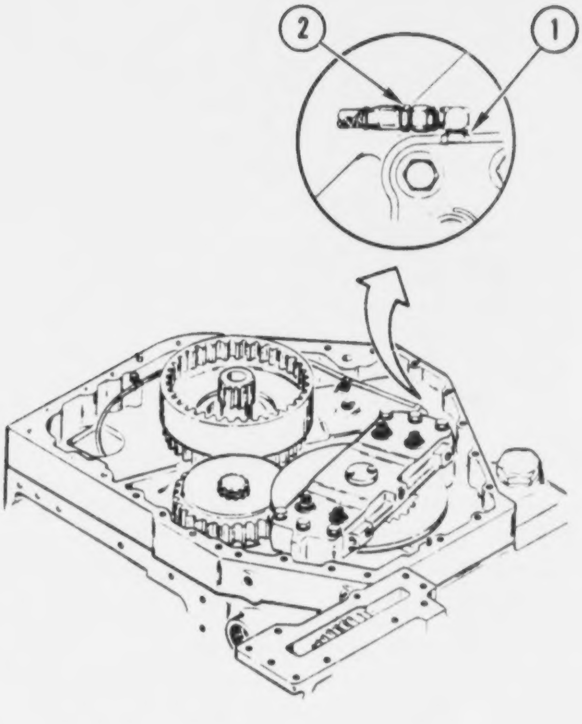
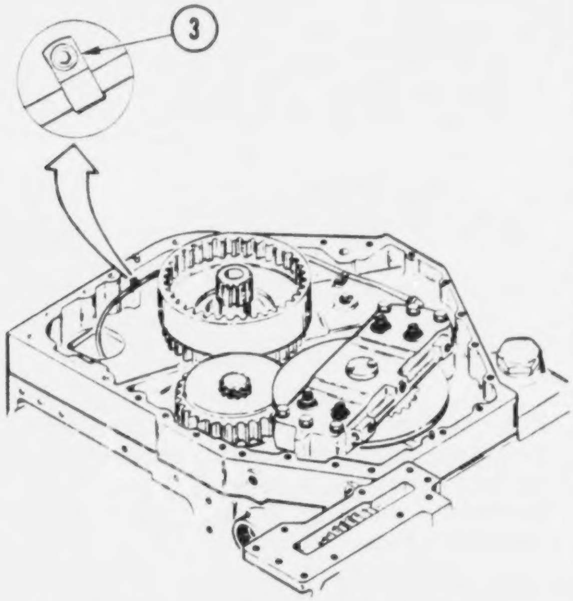
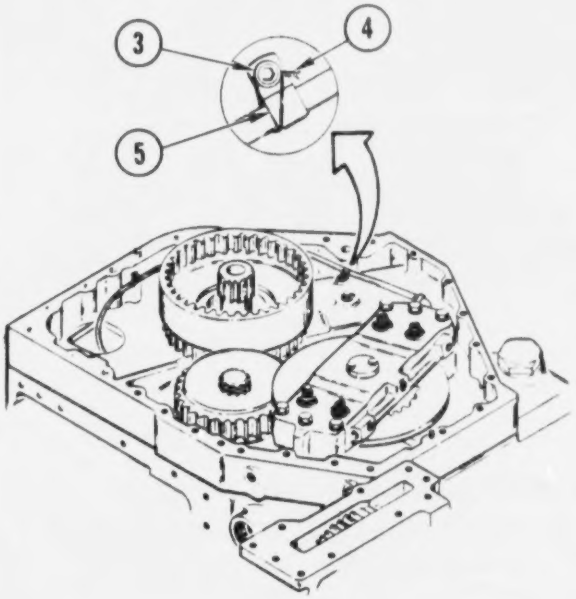


41. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ELBOW NUT (1) TO 125-135 in-lb (144-155 cmkg).

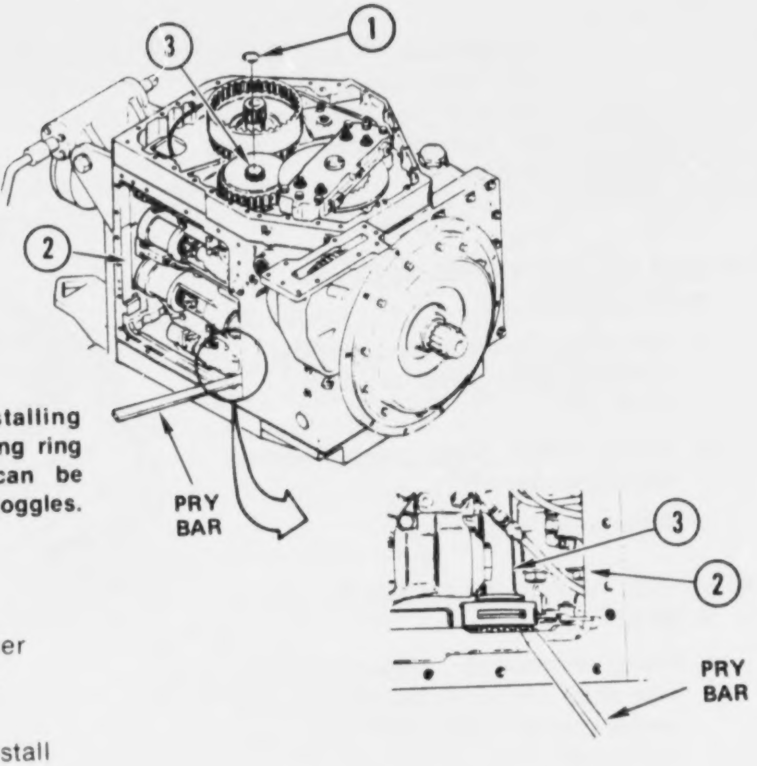
42. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (2) TO 125-135 in-lb (144-155 cmkg).



43. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE THREE SCREWS (3) TO 35-45 in-lb (40-52 cmkg).



44. USING WIRE-TWISTER PLIERS, INSTALL THREE NEW LOCKWIRES (4) IN SCREWS (3) AND AROUND CLAMPS (5).



WARNING

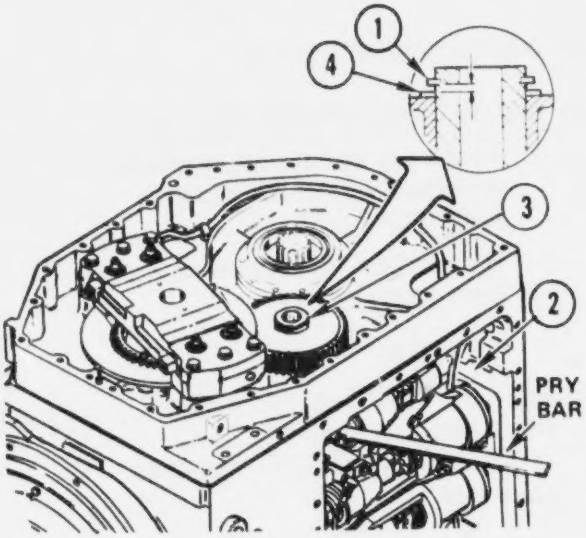
Use care when installing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

45. INSTALL RETAINING RING (1).
    a. (H) Reach in through controller opening (2) and pry up cross shaft (3).
    b. Using retaining-ring pliers, install retaining ring (1).

---

46. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

47. MEASURE GAP BETWEEN RETAINING RING (1) AND SHIM (4).
    a. Position transmission with left side up.
    b. (H) Reach in through controller opening (2) and pry up cross shaft (3).
    c. Measure gap between retaining ring (1) and shim (4). Lower cross shaft (3).
    d. If gap is 0.028-0.037 inch (0.71-0.94 mm), go to step 52. If not, go to step 48.



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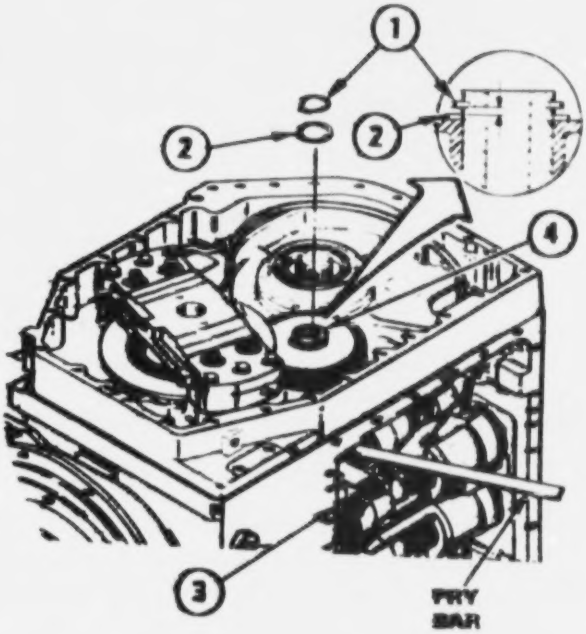
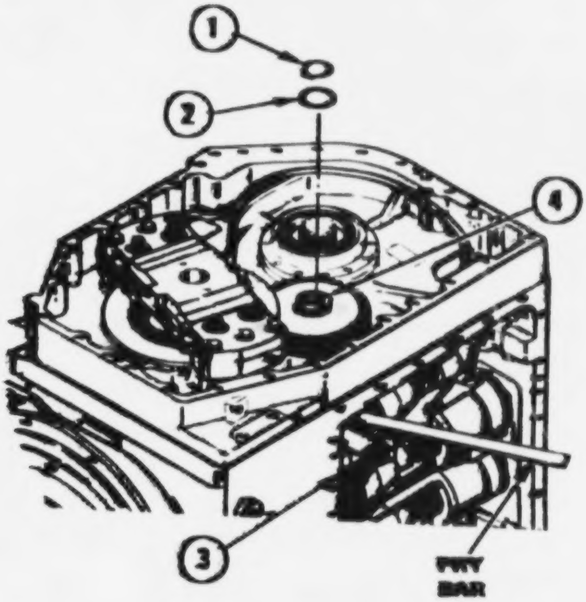
WARNING

Use care when removing retaining ring. Personnel can be injured. Always wear goggles.



48. REMOVE RETAINING RING (1) AND SHIM (2).
    a. (H) Reach in through controller opening (3) and pry up cross shaft (4).
    b. Using retaining-ring pliers, remove retaining ring (1).
    c. Remove shim (2).
49. SELECT NEW SHIM (2) FROM SHIM KIT.
    a. Using micrometer caliper set, select new shim (2) from shim kit that will give a gap of 0.028-0.037 inch (0.71-0.94 mm).



50. INSTALL NEW SHIM (2).
51. INSTALL RETAINING RING (1).
    a. (H) Reach in through controller opening (3) and pry up cross shaft (4).
    b. Using retaining-ring pliers, install retaining ring (1).
    c. Go to step 47.
52. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
53. INSTALL CONTROLLER ASSEMBLY See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-183). Assemble (page 4-191).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing installer — (Item 6, App C)
Bearing installer — (Item 7, App C)
Bearing installer — (Item 8, App C)
Bearing installer — (Item 12, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Inside/outside indicator caliper — (Item 41, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper set — (Item 52, App C)
Micrometer depth gage — (Item 54, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench attachment — (Item 81, App C)
Socket wrench set — (Item 87, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench —(Item 99, App C)
Torque wrench —(Item 100, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Wood blocks (2) — (Item 3, App D)
Disk brake parts kit
Preformed packing (2)
Retaining ring (2)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

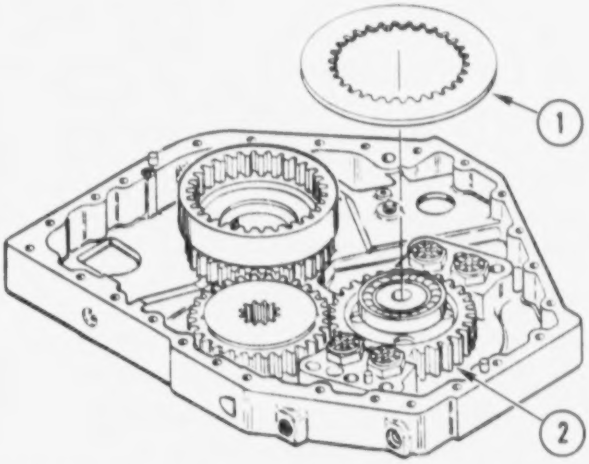
TM 9-214

Equipment Conditions:

Right-hand intermediate housing assembly on workbench. See page 4-170.

DISASSEMBLE

1. REMOVE RIGHT-HAND SINGLE DISK BRAKE. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.
2. REMOVE FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.
3. REMOVE CLUTCH DISK (1) FROM SPUR GEAR (2).



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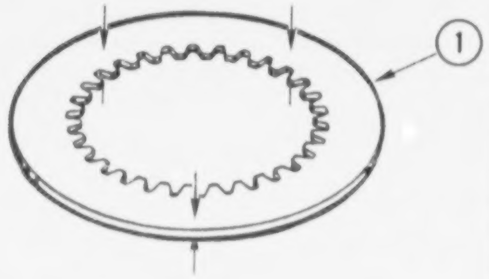


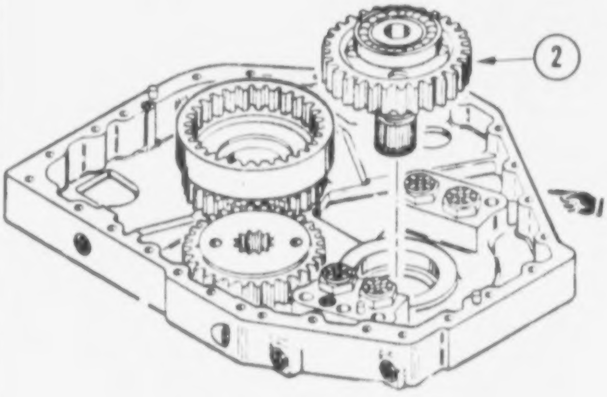
4. CHECK CLUTCH DISK (1).

   a. Using micrometer caliper set, measure thickness of disk (1) in three places.

   b. Replace disk (1) if thickness is less than 0.150 inch (3.81 mm)

   c. Using flat surface and feeler gage, check disk (1) for warpage. Check inside and outside edges in three places.

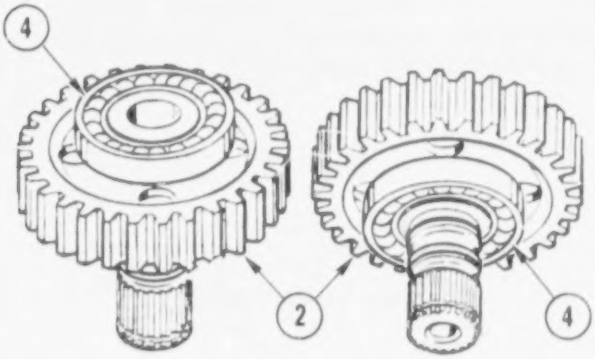
   d. Replace disk (1) if warpage is greater than 0.010 inch (0.25 mm).



5. REMOVE GEAR (2).

   a. Using pry bar, pry out gear (2).

   b. (Deleted)



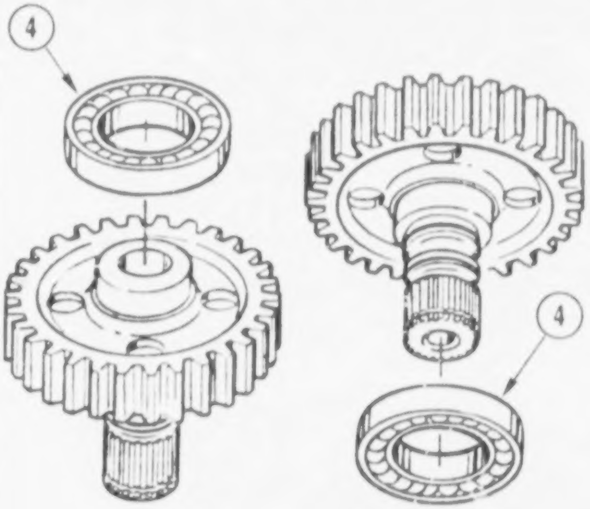
NOTE

Ball bearings might not come out with gear. One bearing may stay in intermediate housing. The other bearing may stay in single disk brake.

6. INSPECT TWO BALL BEARINGS (4).

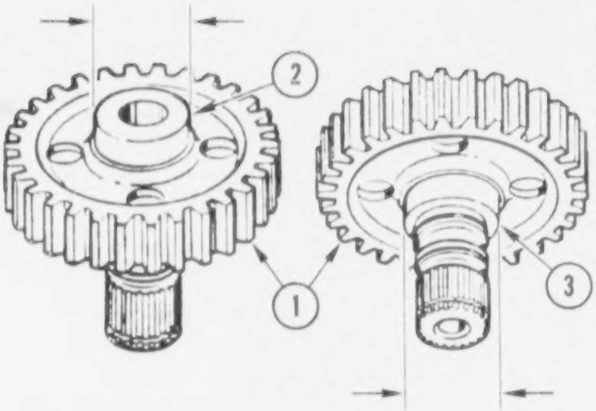
   a. Inspect bearings (4) on each end of gear (2) for damage. See TM 9-214.

   b. If either bearing (4) is damaged, go to step 7. If not, go to step 9.

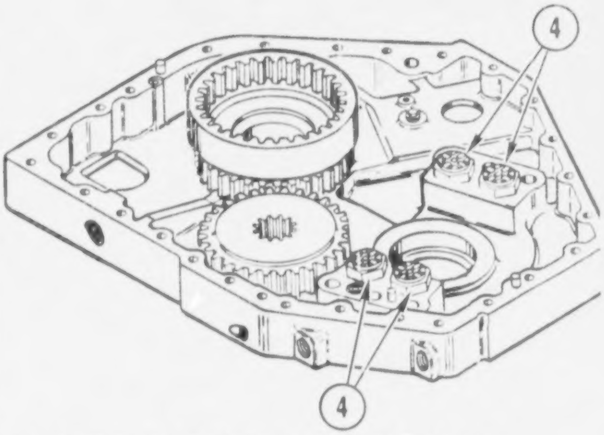


7. REMOVE DAMAGED BEARING(S) (4).

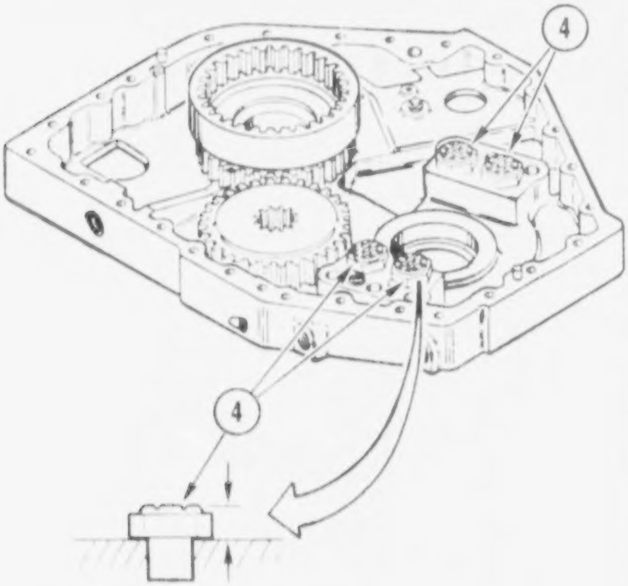
   a. Using mechanical puller kit, remove damaged bearing(s) (4). Discard bearing(s).



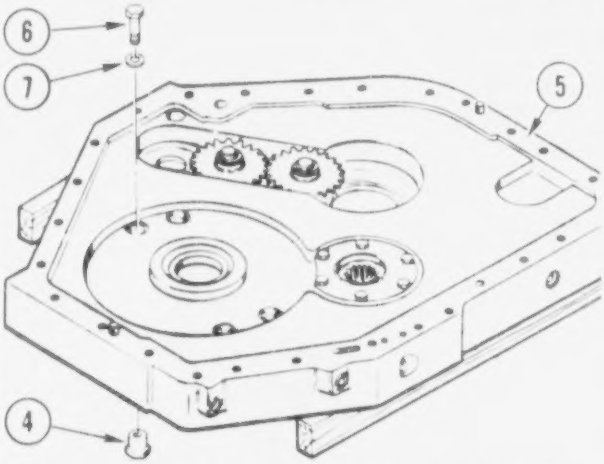
8. CHECK GEAR (1).
   a. Using micrometer caliper set, measure outside diameters (2) and (3).
   b. Replace gear (1) if either measurement is less than 2.9524 inches (74.991 mm).



9. INSPECT FOUR BRAKE PADS (4).
   a. Inspect four pads (4) for damage.
   b. If pads (4) are not damaged, go to step 10. If pads are damaged, go to step 11.



10. CHECK FOUR PADS (4).
    a. Using depth gage, measure height of each pad (4).
    b. If any pad (4) measures less than 0.644 inch (16.36 mm), go to step 11. If all four pads (4) measure 0.644 inch (16.36 mm) or more, go to step 13.



11. REPAIRER AND HELPER TURN RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY (5) OVER AND PLACE ON TWO WOOD BLOCKS.

12. REMOVE FOUR PAD ASSEMBLIES (4).
    a. (H) Using 1-inch drive ratchet handle and 1 3/4-inch socket, hold pad assemblies (4). Repairer, remove four screws (6) and washers (7).
    b. Remove four pad assemblies (4) from underside of housing (5). Discard four pad assemblies.

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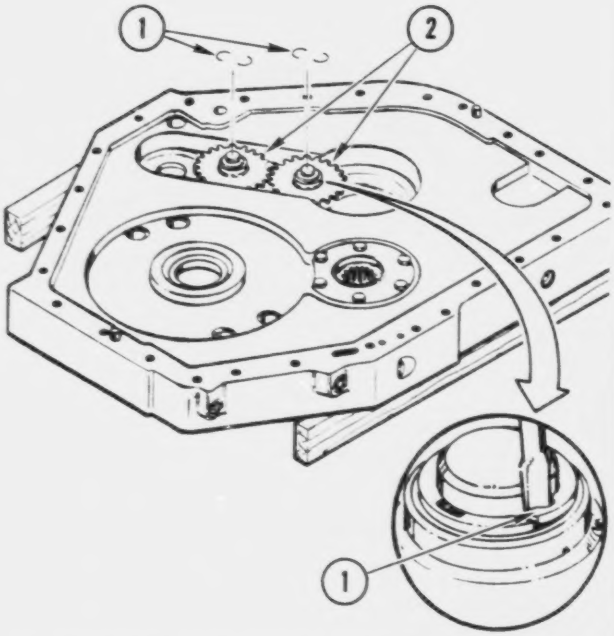
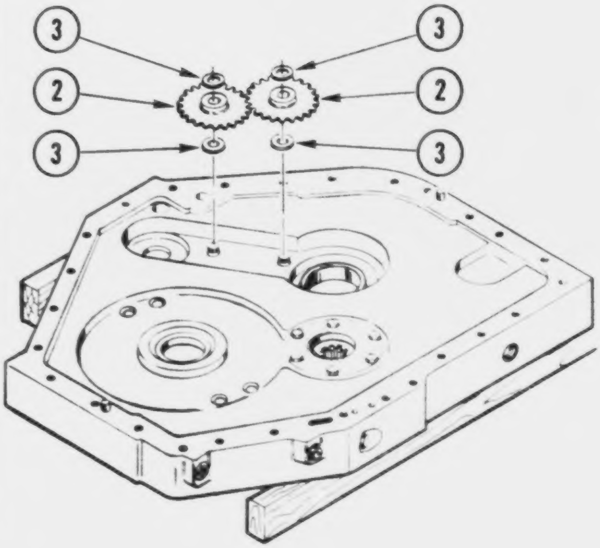


13. REMOVE AND DISCARD RETAINING RINGS (1) FROM TOW PUMP SPUR GEARS (2).

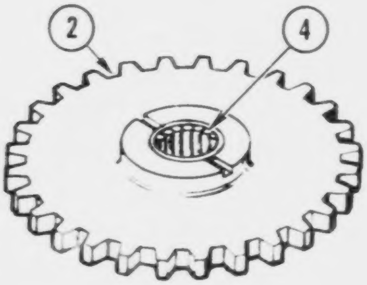
    a. Using screwdriver, remove and discard two retaining rings (1).



14. REMOVE TWO GEARS (2).

    a. Remove two thrust washers (3) and two gears (2).

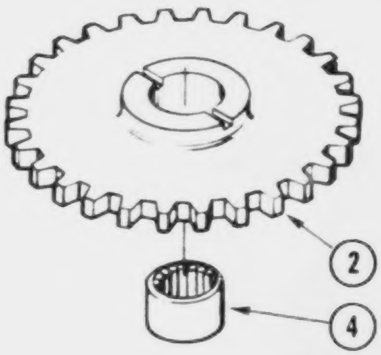
    b. Remove remaining two thrust washers (3).



15. INSPECT NEEDLE ROLLER BEARINGS (4) IN TWO GEARS (2).

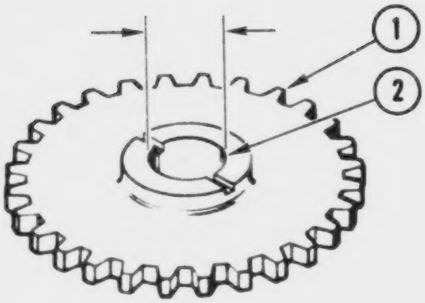
    a. Inspect bearings (4) for damage. See TM 9-214.

    b. If either bearing (4) is damaged, go to step 16. If not, go to step 18.

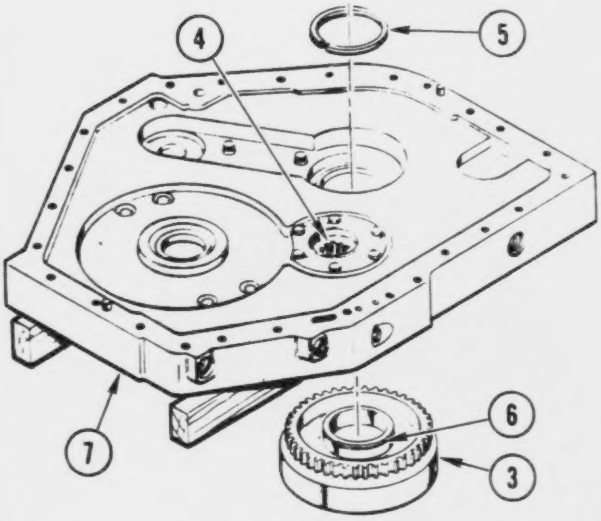


16. REMOVE BEARING (4) FROM GEAR(S) (2).

    a. Using arbor press and bearing installer, (Item 12), remove bearing (4) from bottom side of gear (2). Discard bearing.



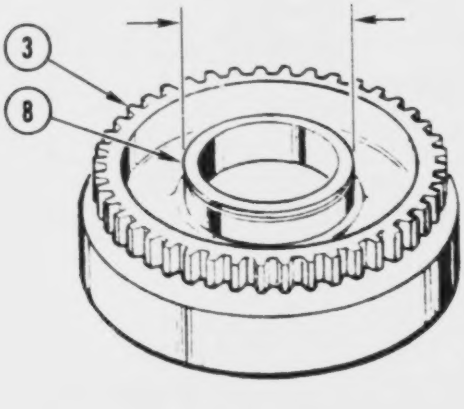
17. CHECK GEAR(S) (1).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter (2).
    b. Replace gear (1) if measurement is greater than 0.688 inch (17.48 mm).



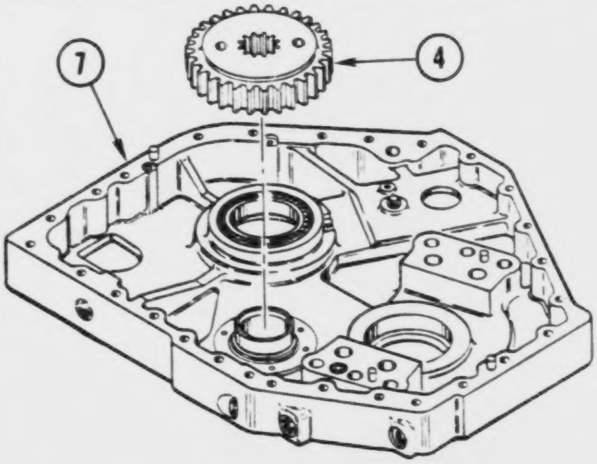
CAUTION

Cross shaft spur gear may be loose and may fall out when spur gear is removed. Damage to equipment can occur.

18. REMOVE SPUR GEAR (3).
    a. (H) Hold cross shaft spur gear (4) and gear (3) in place.
    b. Using retaining-ring pliers, remove retaining ring (5) from groove (6).
    c. Remove gear (3) from underside of housing (7).



19. CHECK GEAR (3).
    a. Using indicator caliper, measure outside diameter of inner hub (8).
    b. Replace gear (3) if measurement is less than 4.3292 inches (109.962 mm).



20. REPAIRER AND HELPER TURN HOUSING (7) OVER WHILE HOLDING GEAR (4).

21. REMOVE GEAR (4).
    a. Using pry bar, pry off gear (4).

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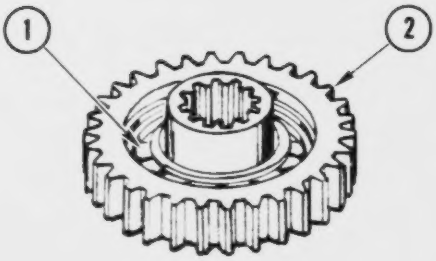
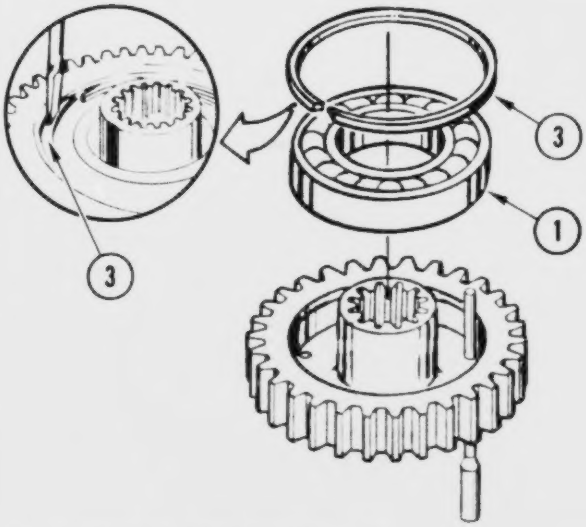
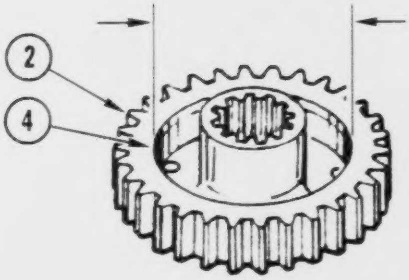


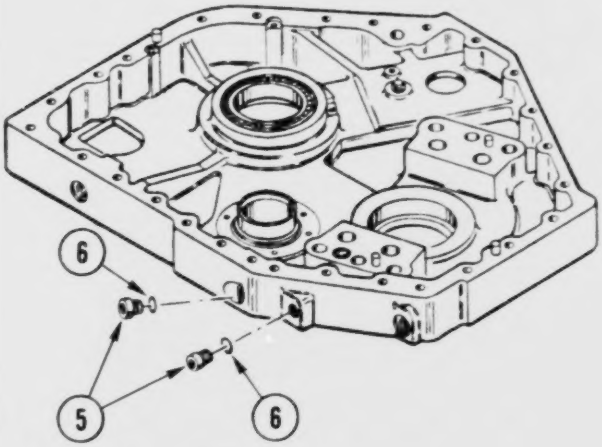
22. INSPECT BALL BEARING (1).
    a. Turn gear (2) over.
    b. Inspect bearing (1) for damage. See TM 9-214.
    c. If bearing (1) is damaged, go to step 23. If not, go to step 25.



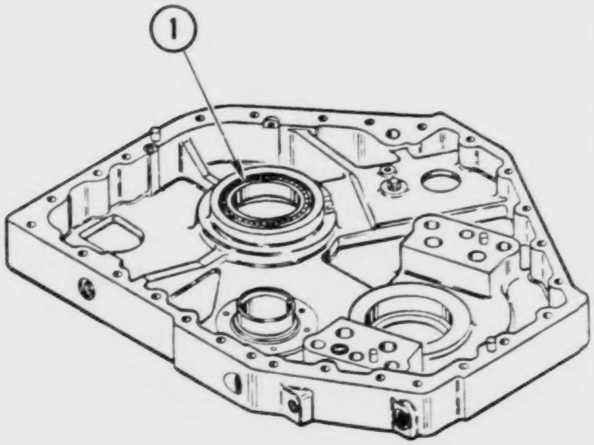
23. REMOVE AND DISCARD BEARING (1).
    a. Using screwdriver, remove retaining ring (3).
    b. Using drive punch, tap out and discard bearing (1).



24. CHECK GEAR (2).
    a. Using indicator caliper, measure inside diameter of outer rim (4).
    b. Replace gear (2) if measurement is greater than 5.5114 inches (140.000 mm).



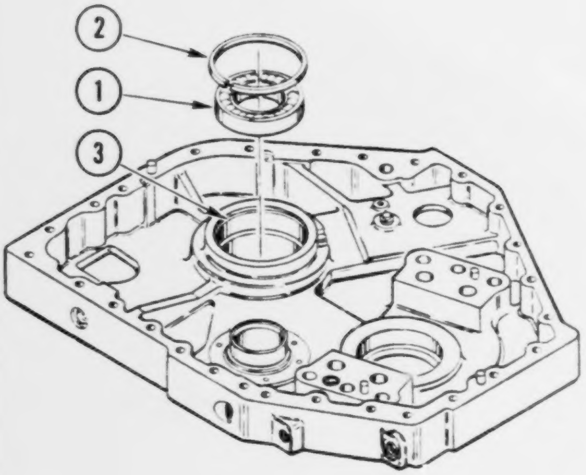
25. REMOVE TWO PLUGS (5).
    a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove two plugs (5).
    b. Remove and discard two preformed packings (6).



26. INSPECT BALL BEARING (1).

   a. Inspect bearing (1) for damage. See TM 9-214.

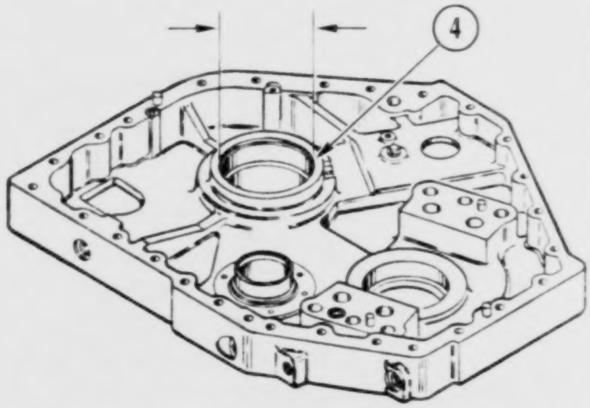
   b. If bearing (1) is damaged, go to step 27. If not, go to step 29.



27. REMOVE BEARING (1).

   a. Using screwdriver, remove retaining ring (2) from groove (3).

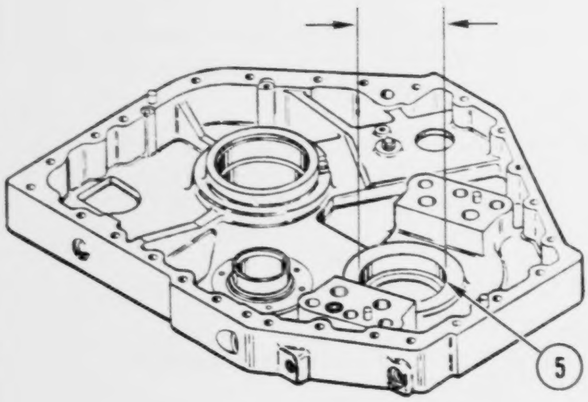
   b. Using mechanical puller kit, remove and discard bearing (1).



28. CHECK BEARING BORE (4).

   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bore (4).

   b. If measurement is greater than 5.9051 inches (150.000 mm), go to step 34. If not, go to step 29.



29. CHECK BEARING BORE (5).

   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bore (5).

   b. If measurement is greater than 4.5290 inches (115.037 mm), go to step 34. If not, go to step 30.

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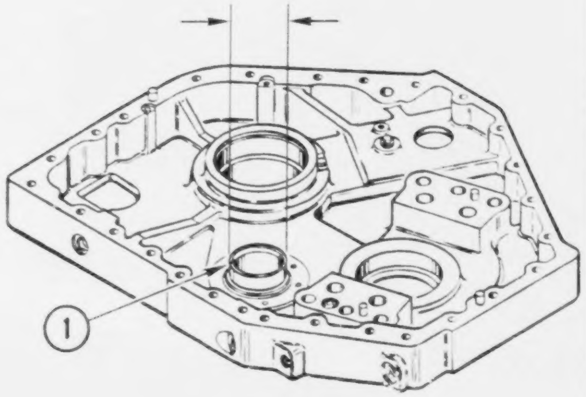
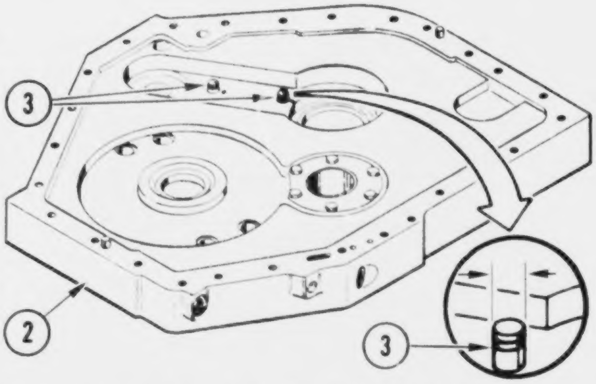


30. CHECK MECHANICAL HOUSING (1).
    - a. Using micrometer caliper set, measure outside diameter of mechanical housing (1).
    - b. If measurement is less than 3.1478 inches (79.954 mm), go to step 34. If not, go to step 31.



31. REPAIRER AND HELPER TURN RIGHT-HAND INTERMEDIATE HOUSING (2) OVER.

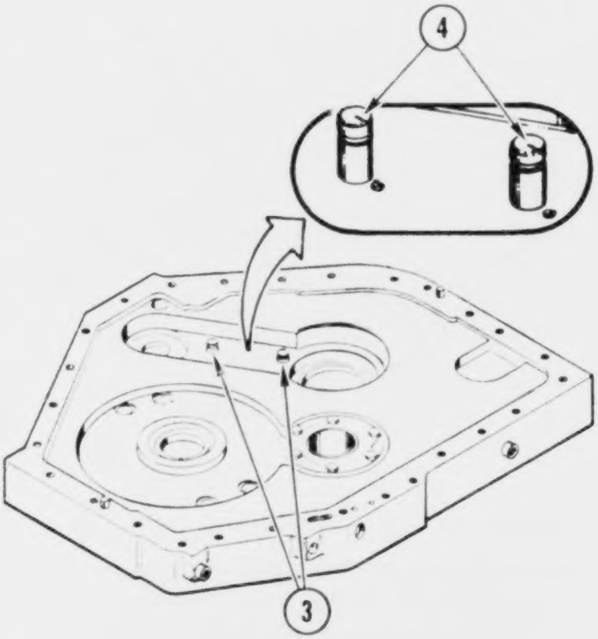
32. CHECK TWO SHOULDERED SHAFTS (3).
    - a. Using micrometer caliper set, measure outside diameters of two shafts (3).
    - b. If either measurement is less than 0.4993 inch (12.682 mm), go to step 34. If not, go to step 33.

33. INSPECT SCRIBE MARKS (4) ON SHAFTS (3).
    - a. If scribe marks (4) are alined with small holes in housing, go to step 35. If not, go to step 34.

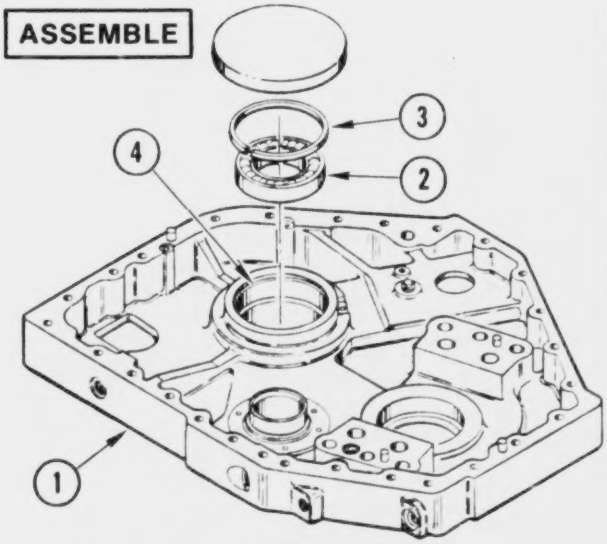
34. REPLACE RIGHT-HAND INTERMEDIATE HOUSING. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING TO DEPOT. GO TO STEP 37.

35. CLEAN RIGHT-HAND INTERMEDIATE HOUSING.
    - a. Clean housing and piece parts. See page 2-2.

36. INSPECT RIGHT-HAND INTERMEDIATE HOUSING.
    - a. Inspect housing, piece parts, and inserts. See page 2-5.
    - b. Repair inserts if damaged. See task REPAIR RIGHT-HAND INTERMEDIATE HOUSING INSERTS, page 4-195.

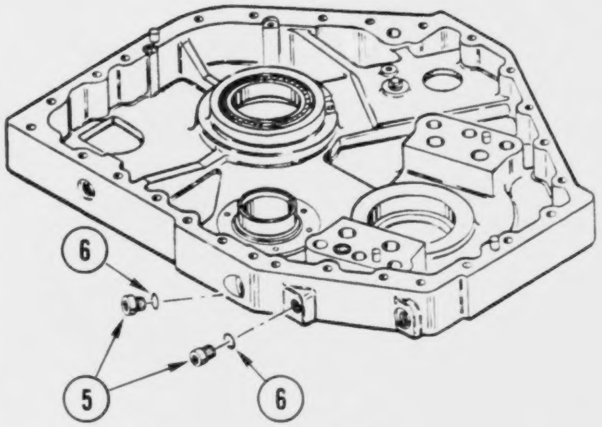


ASSEMBLE



37. REPAIRER AND HELPER TURN HOUSING (1) OVER.

38. INSTALL NEW BALL BEARING (2).
    a. If bearing (2) was removed, go to step 38b. If not, go to step 39.
    b. Using plastic-faced hammer and bearing installer (Item 8) install bearing (2).
    c. Install retaining ring (3) in groove (4).



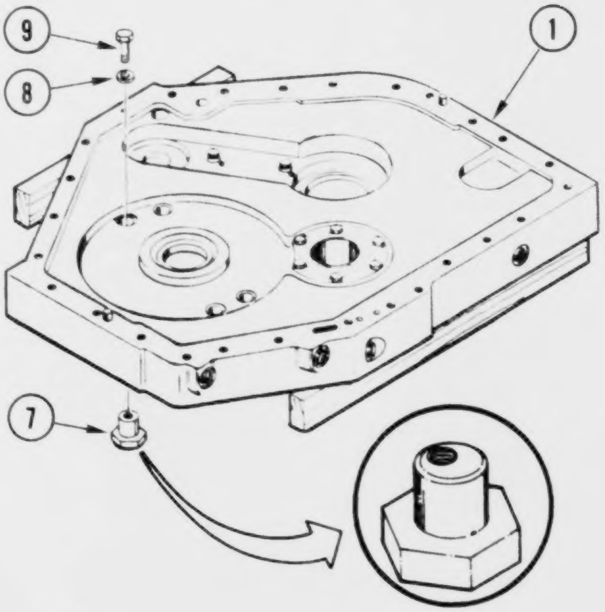
39. INSTALL TWO PLUGS (5).
    a. Coat two new preformed packings (6) with transmission oil. Install packings on two plugs (5).
    b. Install two plugs (5).

40. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (5) TO 110-120 in-lb (127-138 cmkg).

41. REPAIRER AND HELPER TURN HOUSING (1) OVER AND PLACE ON WOOD BLOCKS.

42. INSTALL FOUR NEW BRAKE PADS (7).
    a. If pads (7) were discarded, replace with new pads. If pads were not discarded, go to step 44.
    b. Position four pads (7) from underside of housing (1). Rotate pads until hole in pad alines with screw hole in housing.
    c. (H) Using 1-inch drive ratchet handle and 1 3/4 inch socket, hold pads (7). Install four washers (8) and screws (9).

43. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE FOUR SCREWS (9) TO 40-45 ft-lb (6 mkg).



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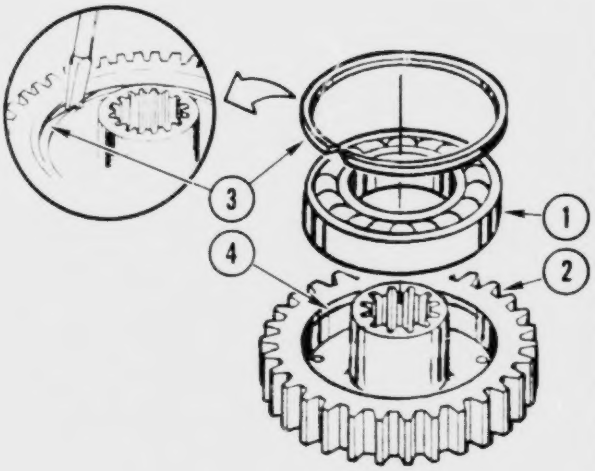
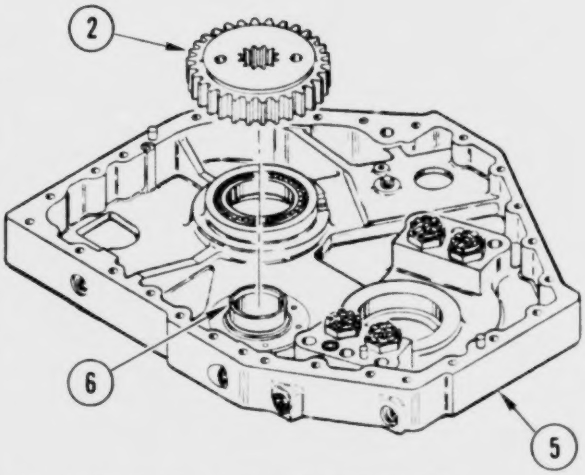


44. INSTALL NEW BALL BEARING (1) IN CROSS SHAFT SPUR GEAR (2).
    a. If bearing (1) was removed, go to step 44b. If not, go to step 45.
    b. Using arbor press and bearing installer (Item 6), press bearing (1) into gear (2).
    c. Using screwdriver, install retaining ring (3) in groove (4).

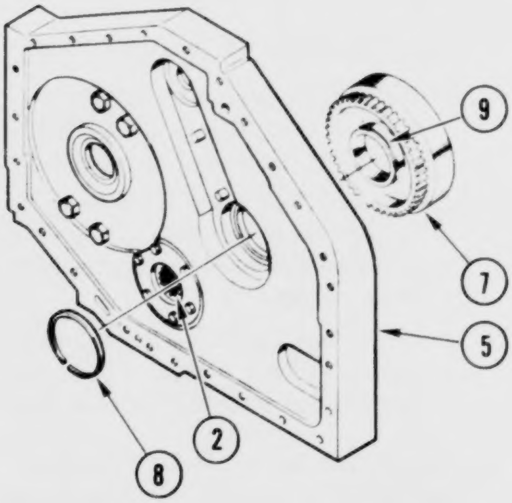


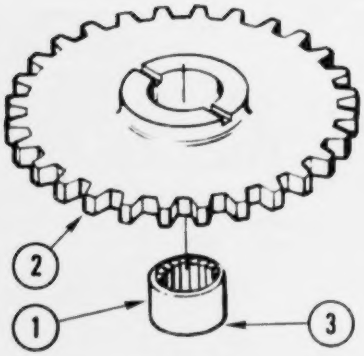
45. REPAIRER AND HELPER TURN HOUSING (5) OVER.

46. INSTALL CROSS SHAFT SPUR GEAR (2).
    a. Using plastic-faced hammer, tap gear (2) onto mechanical housing (6).

CAUTION
Cross shaft spur gear may be loose and may fall off. Damage to equipment can occur.

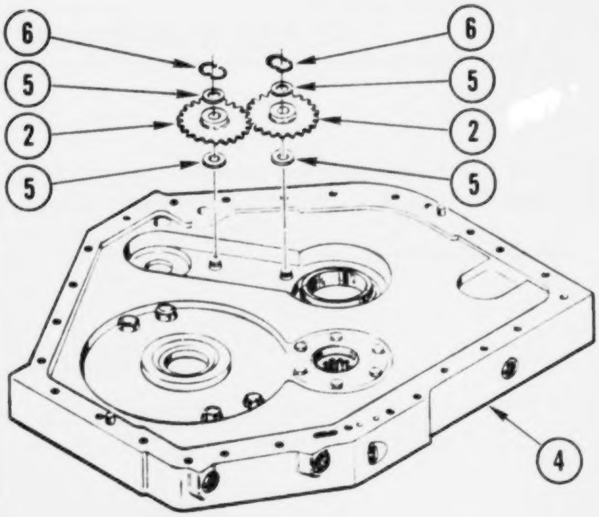
47. REPAIRER AND HELPER INSTALL SPUR GEAR (7).
    a. (H) Helper hold housing (5) in upright position while holding gear (2).
    b. Install gear (7).
    c. Using retaining-ring pliers, install retaining ring (8) in groove (9).





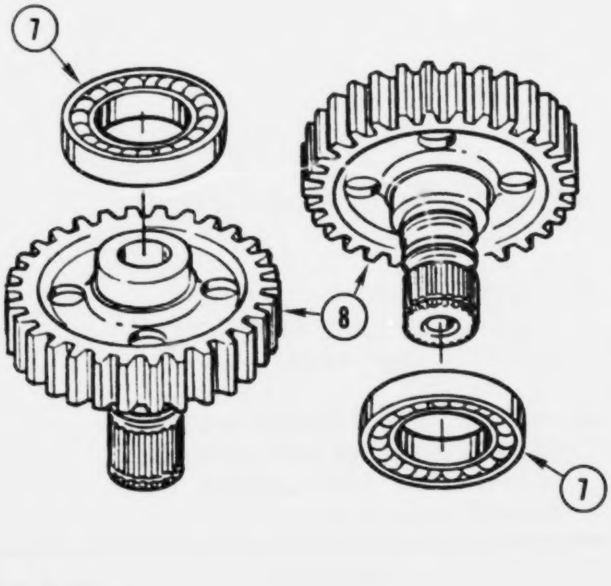
CAUTION
Do not install bearing in hub side of gear. Equipment can be damaged.

48. INSTALL NEW NEEDLE BEARING (1) IN TOW PUMP SPUR GEAR (2).
    a. If either bearing (1) was removed, go to step 48b. If not, go to step 49.
    b. Place bearing (1) on bearing installer (Item 12) with part number end (3) of bearing against installer.
    c. Using arbor press and bearing installer, press bearing (1) into gear (2).



NOTE
Gears are installed with raised hubs facing up.

49. INSTALL TWO GEARS (2).
    a. (H) Lower housing (4) to workbench.
    b. Install two thrust washers (5), gears (2), and remaining two thrust washers (5).
    c. Install two new retaining rings (6).



50. INSTALL TWO NEW BALL BEARINGS (7) ON SPUR GEAR (8).
    a. If either bearing (7) was removed, go to step 50b. If not, go to step 51.
    b. Using arbor press and bearing installer (Item 7), press bearing(s) (7) onto gear (8).

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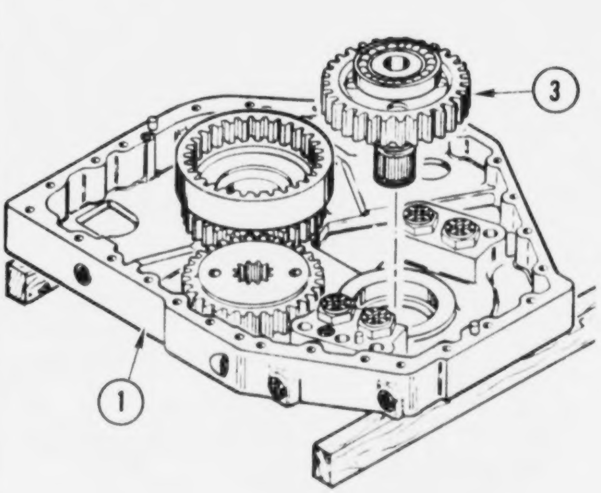
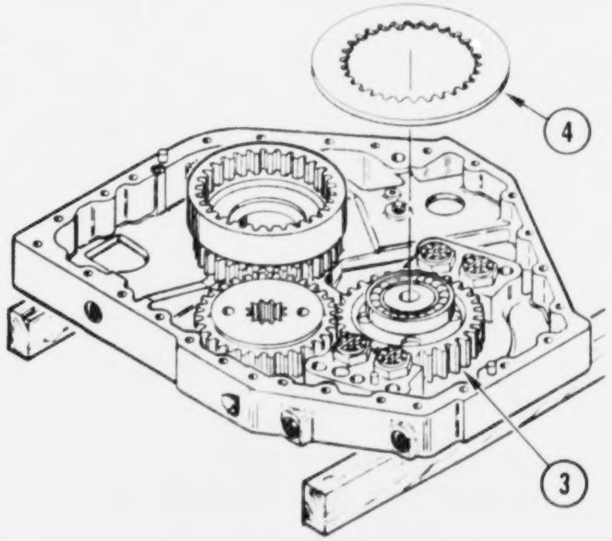
51. (DELETED)



52. REPAIRER AND HELPER TURN HOUSING (1) OVER AND PLACE ON WOOD BLOCKS.

53. INSTALL GEAR (3).

    a. Using plastic-faced hammer, tap gear (3) into housing (1).



54. INSTALL CLUTCH DISK (4) ON GEAR (3).

55. INSTALL FRICTION CLUTCH. See task REPLACE FRICTION CLUTCH, page 4-208.

56. INSTALL RIGHT-HAND SINGLE DISK BRAKE. See task REPLACE RIGHT-HAND SINGLE DISK BRAKE, page 4-197.

END OF TASK

REPAIR RIGHT-HAND INTERMEDIATE HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the right-hand intermediate housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Socket wrench set — (Item 89, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11,App B)
- Transmission oil — (Item 12, App B)

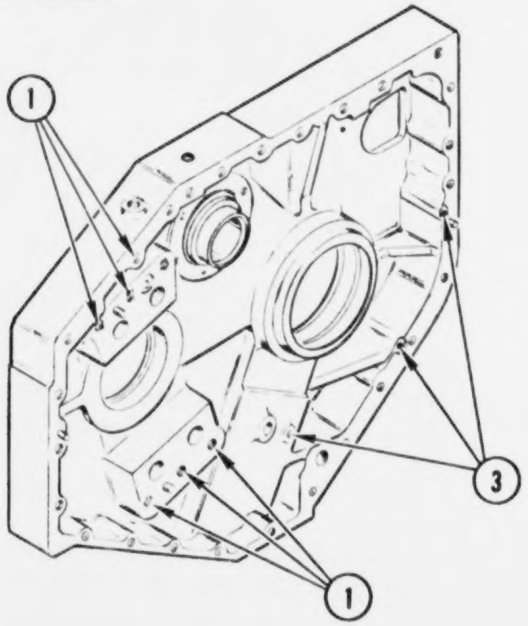
Personnel Required:

- Track Veh Rep 63H10

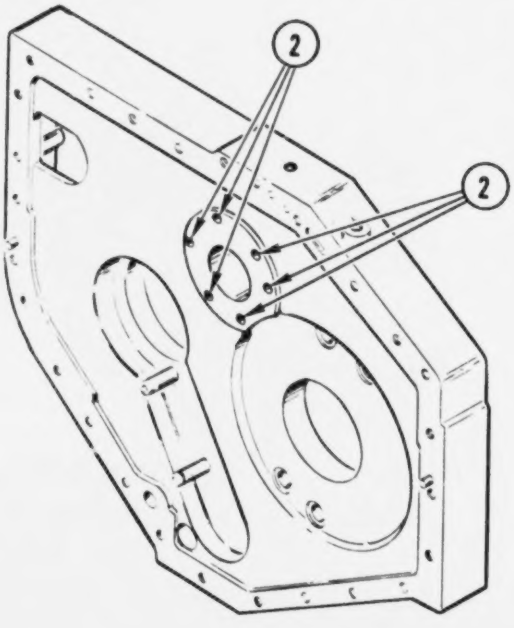
Equipment Conditions:

- Right-hand intermediate housing on workbench. See page 4-183.

REPAIR



FRONT VIEW



REAR VIEW

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STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD / OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counterbore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-37L SR628L	SR628R		SR62T	RZA12788-7 RZA12656-7	.181-.191 in. (4.60-4.85 mm)	SR62WA	.045-.055 in. (1.14-1.40 mm)
	M45932/3-37L SRW628L	SRW628R	SRW62D	SRW62T	RZA12789-7 RZA12791-7	.181-.191 in. (4.60-4.85 mm)	SR62WA	.045-.055 in. (1.14-1.40 mm)
2	TO BE CHANGED AT DEPOT							
3	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)

END OF TASK

REPLACE RIGHT-HAND SINGLE DISK BRAKE

DESCRIPTION

This task covers: Remove (page 4-197). Install (page 4-200).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
General mechanic's tool kit:
 automotive — (Item 33, App C)
Micrometer depth gage — (Item 54, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)

Materials/Parts: (cont)

Preformed packing
Preformed packing
Self-locking bolts (6)

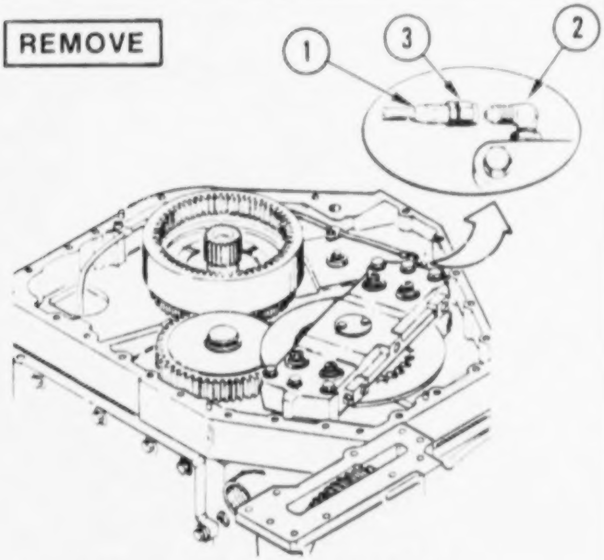
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

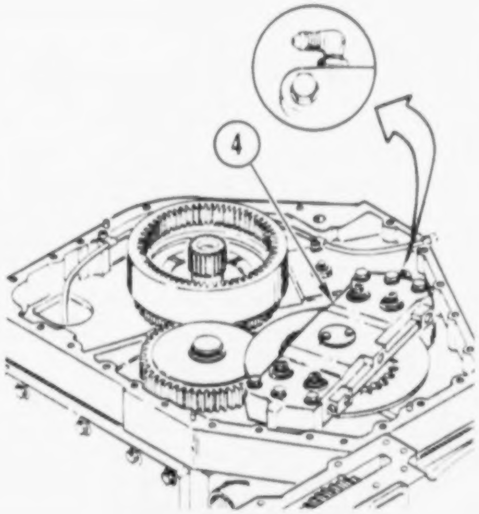
REMOVE



1. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

2. DISCONNECT HOSE ASSEMBLY (1) FROM HOSE TO BOSS ELBOW (2).

   a. Unscrew fitting (3) on hose assembly (1).



3. INSPECT ELBOW (2).

   a. Inspect elbow (2) for damage. See page 2-5.

   b. If elbow (2) is damaged or if single disk brake (4) is to be replaced, go to step 4. If elbow is not damaged and brake is not to be replaced, go to step 5.

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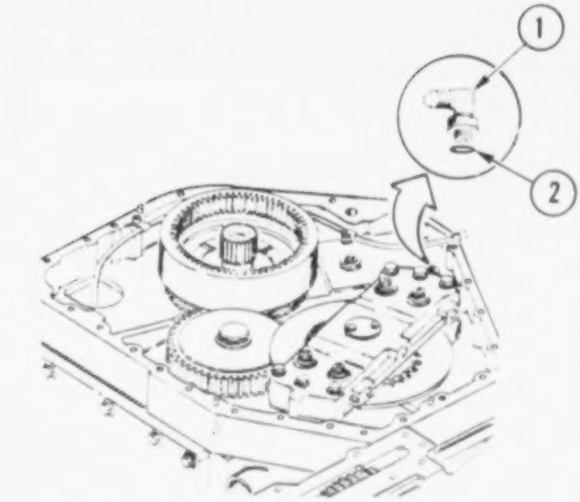
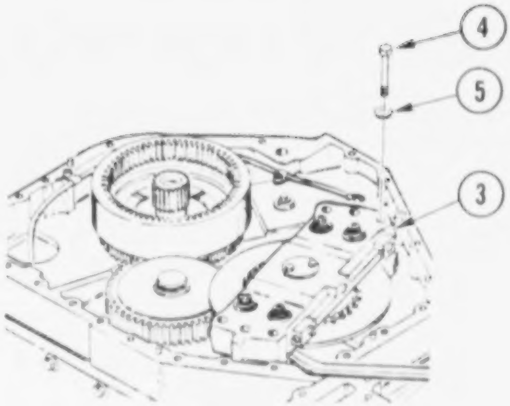
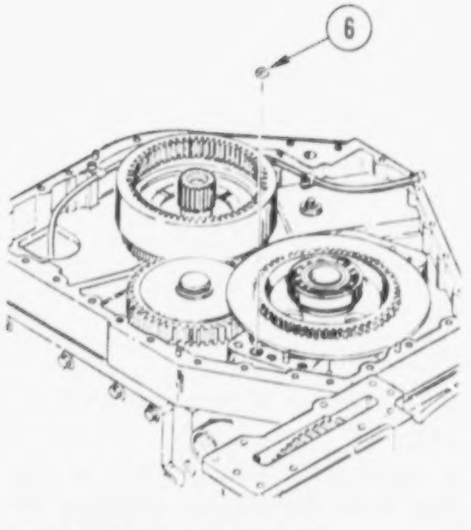


4. REMOVE ELBOW (1).
   - a. Unscrew elbow (1).
   - b. Remove and discard preformed packing (2).

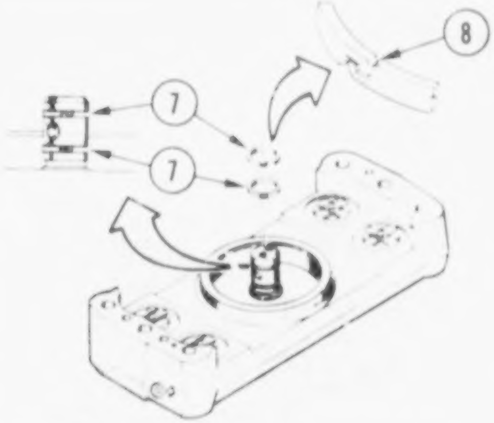


CAUTION
Do not pry against clutch disk. Damage to equipment can occur.

5. REMOVE BRAKE (3).
   - a. Remove six self-locking bolts (4) and washers (5). Discard bolts.
   - b. Using pry bar, pry off brake (3).

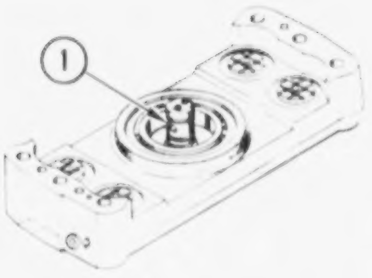


6. REMOVE AND DISCARD PREFORMED PACKING (6).



7. INSPECT METAL SEAL RINGS (7).
   - a. Inspect rings (7) for damage. See page 2-5.
   - b. If rings (7) are damaged, go to step 8. If not, go to step 12.

8. REMOVE TWO RINGS (7).
   - a. Squeeze ring (7) with fingers until hooks (8) release.
   - b. Spread open and remove each ring (7). Discard rings.



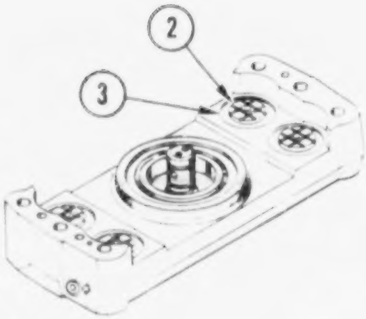
9. INSPECT SPINDLE (1).

   a. Inspect spindle (1) for damage. See page 2-5.

   b. If spindle (1) is damaged, go to step 10. If not, go to step 12.

10. REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-202.

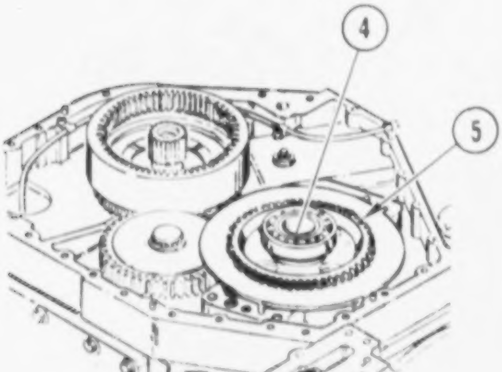
11. GO TO STEP 13.



12. INSPECT FOUR PADS (2) ON PISTON ASSEMBLIES (3).

    a. Inspect four pads (2) for damage. See page 2-5.

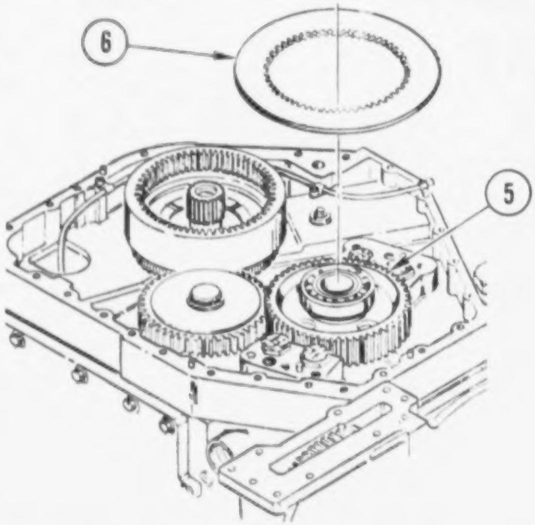
    b. If pads (2) are not damaged, go to step 13. If any pads are damaged, replace all piston assemblies (3). See task REPAIR RIGHT-HAND SINGLE DISK BRAKE, page 4-202.



13. INSPECT BORE (4) OF SPUR GEAR (5).

    a. Inspect bore (4) of spur gear (5) for grooves, scoring, and scratches.

    b. If bore (4) is damaged, go to step 18. If not, go to step 14.



14. INSPECT CLUTCH DISK (6) ON SPUR GEAR (5).

    a. Remove disk (6) and inspect both sides for damage. See page 2-5.

    b. If disk (6) is damaged, replace it and go to step 15. If not, go to step 14.1

GO TO NEXT PAGE

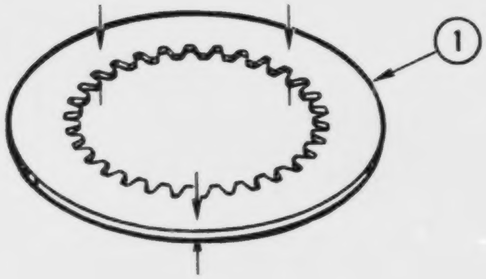
14.1 CHECKS DISK (1).

a. Using micrometer caliper set, measure thickness of disk (1) in three places.

b. Replace disk (1) if thickness is less than 0.150 inch (3.81 mm).

c. Using flat surface and feeler gage, check disk (1) for warpage. Check inside and outside edges in three places.

d. Replace disk (1) if warpage is greater than 0.010 inch (0.25 mm).



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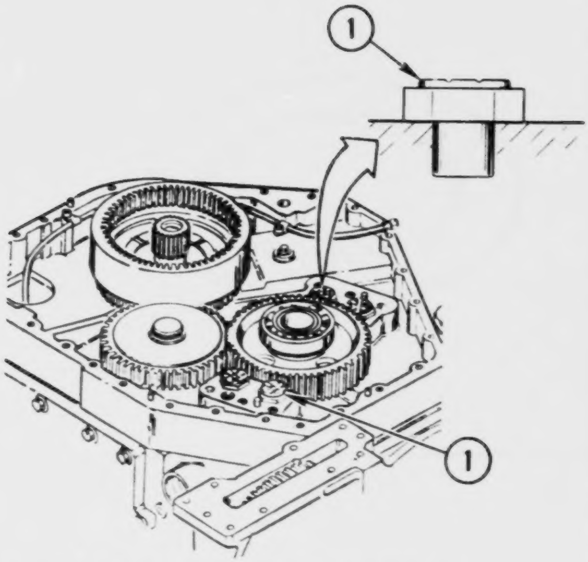
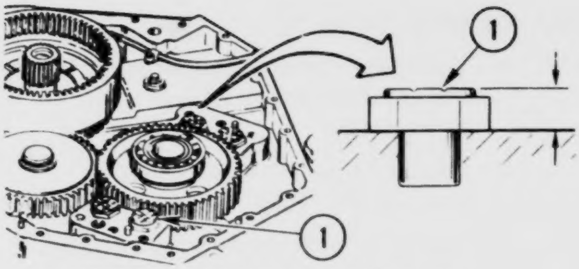


15. INSPECT FOUR BRAKE PADS (1).
    a. Inspect four brake pads (1) for damage. See page 2-5.
    b. If no pads (1) are damaged, go to step 16. If any pad is damaged, replace all pads. Go to step 17.

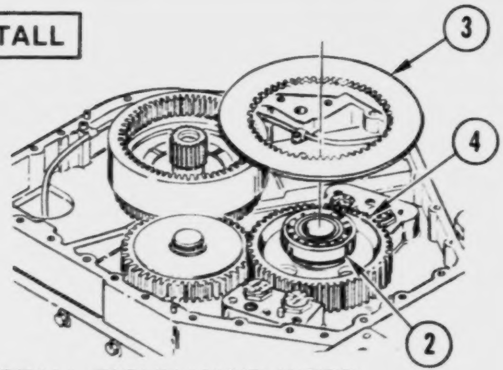


16. CHECK FOUR BRAKE PADS (1).
    a. Using depth gage, measure height of four brake pads (1).
    b. If all brake pads (1) measure 0.644 inch (16.36 mm) or more, go to step 19. If any brake pad measures less than 0.644 inch (16.36 mm), replace all pads.

17. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

18. REPAIR RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-183.

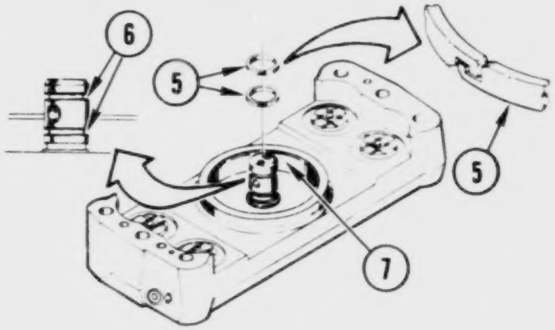
INSTALL



19. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, IF REMOVED. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

20. COAT OUSIDE OF BALL BEARING (2) WITH TRANSMISSION OIL.

21. PLACE DISK (3) ON SPUR GEAR (4).

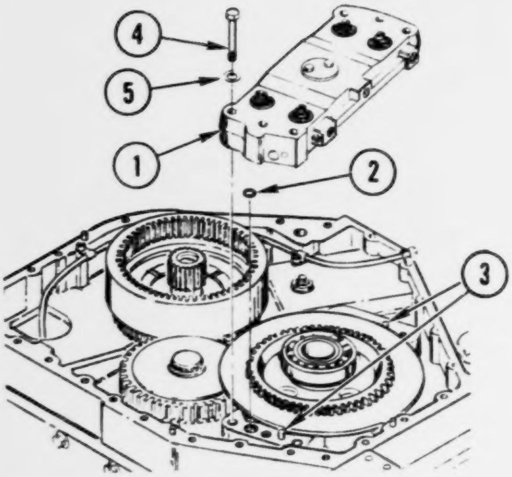


22. IF TWO RINGS (5) WERE REMOVED, GO TO STEP 23. IF NOT, GO TO STEP 24.

23. INSTALL NEW RINGS (5).
    a. Coat new rings (5) with petrolatum.
    b. Install new rings (5) in grooves (6).
    c. Hook new rings (5) by squeezing together with fingers.
    d. Coat inside of bearing bore (7) with transmission oil.

CAUTION

Do not install self-locking bolts without sealing compound on threads. Damage to equipment can occur.



24. INSTALL BRAKE (1).

    a. Coat new preformed packing (2) with transmission oil. Install new packing.

    b. Aline brake (1) with two pins (3). Install brake until fully seated.

    c. Coat threads of six new self-locking bolts (4) with sealant compound.

    d. Secure brake (1) with six washers (5) and bolts (4).

25. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (4) TO 150-160 ft-lb (21-22 mkg).

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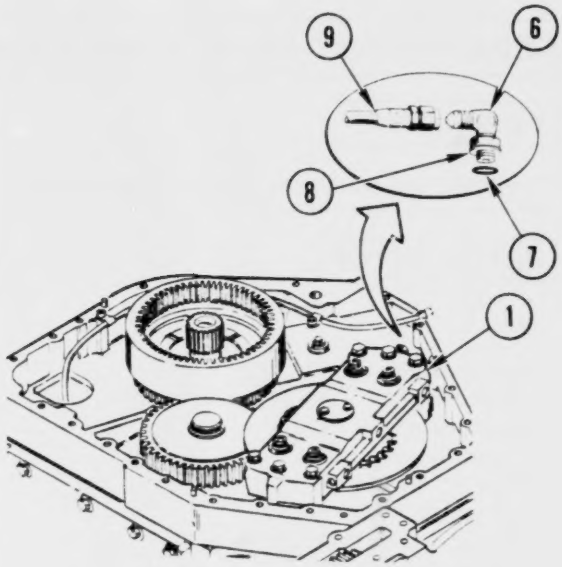


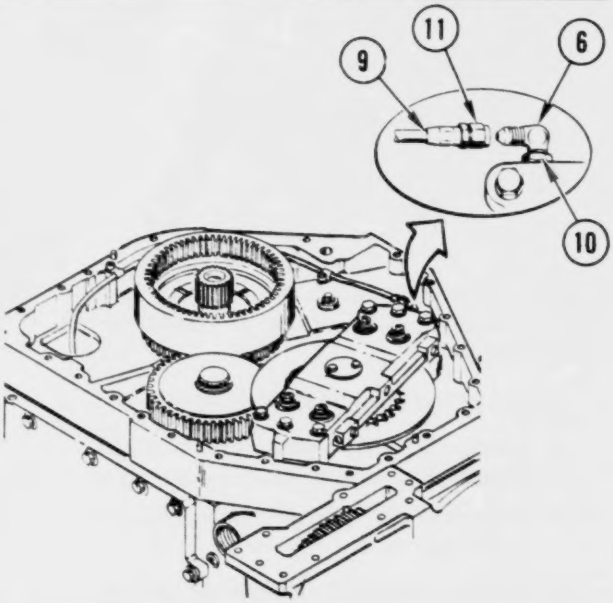
26. INSTALL ELBOW (6), IF REMOVED.
    a. Coat new preformed packing (7) with transmission oil and install packing on elbow (6).
    b. Screw elbow (6) into brake (1). Hand tighten until captive washer (8) makes firm contact with brake.
    c. Unscrew elbow (6) to position required to install hose assembly (9).

27. CONNECT HOSE ASSEMBLY (9) TO ELBOW (6).

28. HOLD ELBOW (6). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (10) TO 125-135 in-lb (144-155 cmkg).

29. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE FITTING (11) TO 125-135 in-lb (144-155 cmkg).

30. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.



END OF TASK

REPAIR RIGHT-HAND SINGLE DISK BRAKE

DESCRIPTION

This task covers: Disassemble (page 4-202). Assemble (page 4-205).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer caliper set — (Item 52, App C)
- Socket wrench attachment — (Item 81, App C)
- Socket wrench set — (Item 89, App C)
- Telescoping gage set — (Item 93, App C)
- Torque wrench (Item 99, App C)

Materials/Parts:

- Transmission oil — (Item 12, App B)
- Disk brake parts kit

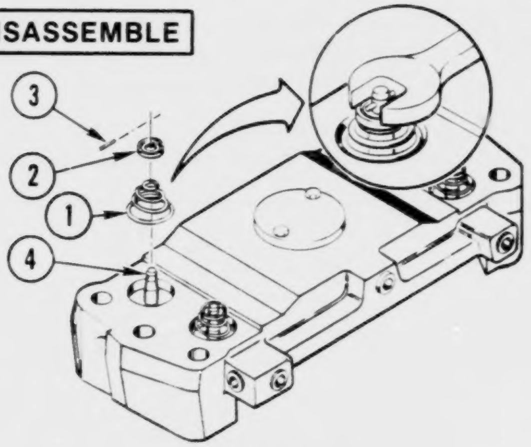
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Right-hand single disk brake on workbench. See page 4-197.

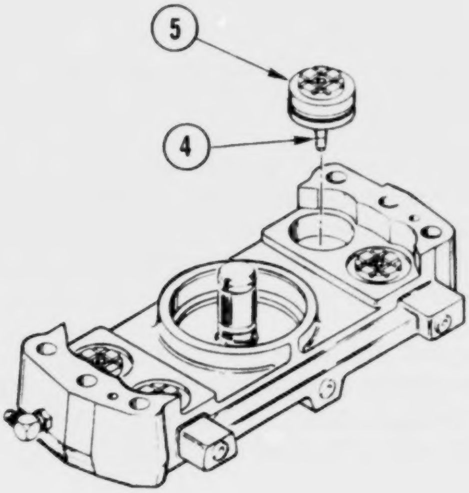
DISASSEMBLE



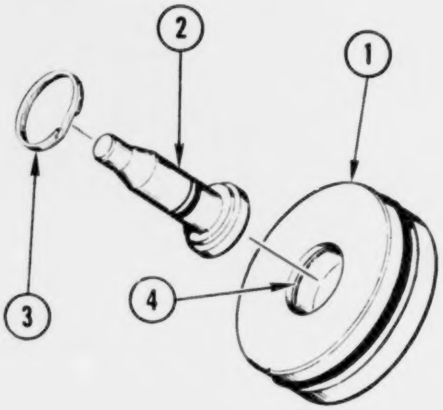
CAUTION

Shaft collar is installed under spring tension. Do not lose parts when removing piston retaining pin.

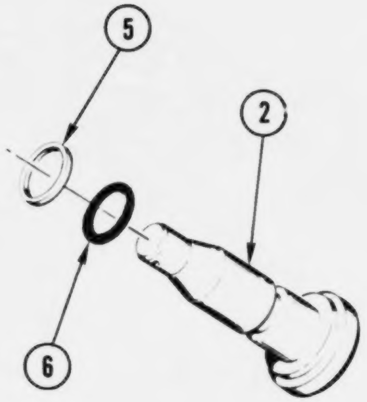
1. REMOVE SPRING (1).
   a. Using 9/16-inch open end wrench, press shaft collar (2) and spring (1).
   b. Remove pin (3) from brake piston rod (4).
   c. Slowly release pressure on spring (1). Remove collar (2) and spring.



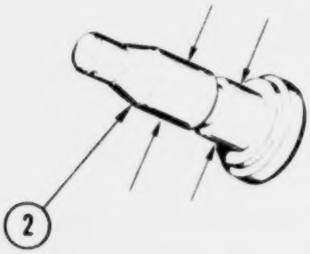
2. REMOVE PISTON ASSEMBLY (5) WITH ROD (4).



3. REMOVE PISTON ASSEMBLY (1) FROM ROD (2)
   - a. Remove retaining ring (3) from groove (4) in piston assembly (1). Discard retaining ring.
   - b. Remove and discard piston assembly (1).

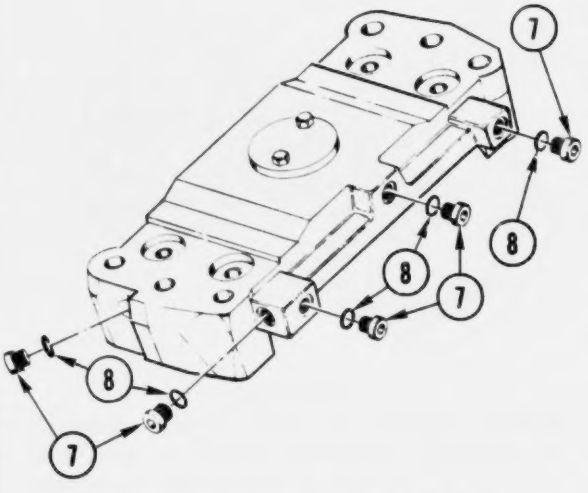


4. REMOVE AND DISCARD PACKING RETAINER (5) AND PREFORMED PACKING (6) FROM ROD (2).



5. CHECK ROD (2).
   - a. Using micrometer caliper set, measure diameter of rod (2) in two places.
   - b. Replace rod (2) if either measurement is less than 0.418 inch (10.62 mm).
   - c. Replace rod (2) if scored.

6. REPEAT STEPS 1 THROUGH 5 FOR REMAINING THREE PISTON ASSEMBLIES.



7. REMOVE FIVE MACHINE THREAD PLUGS (7).
   - a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, unscrew five plugs (7).
   - b. Remove and discard five preformed packings (8).

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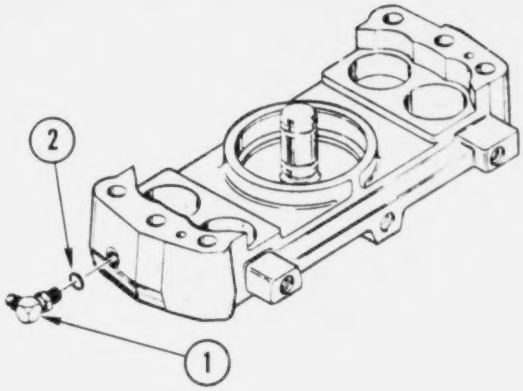
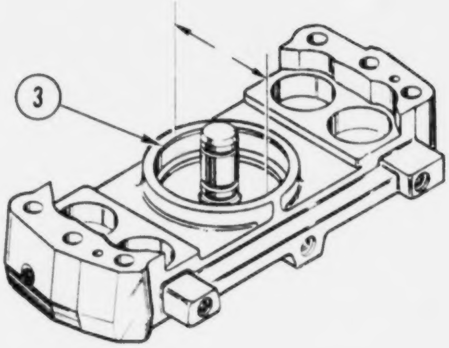
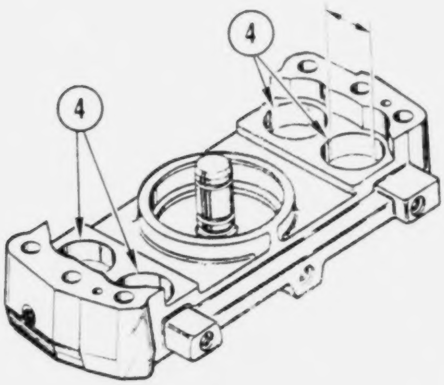


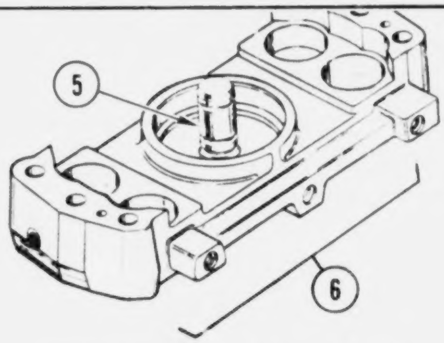
8. REMOVE HOSE TO BOSS ELBOW (1) IF ATTACHED.
    a. Unscrew elbow (1).
    b. Remove and discard preformed packing (2).



9. CHECK BEARING BORE (3).
    a. Using indicator caliper, measure diameter of bearing bore (3).
    b. If diameter of bearing bore (3) is greater than 4.529 inches (115.04 mm), go to step 11.1. If not, go to step 10.



10. CHECK PISTON BORES (4).
    a. Using telescoping gage set and micrometer caliper set, measure diameter of four piston bores (4).
    b. If any piston bore (4) diameter is greater than 2.122 inches (53.90 mm), go to step 11.1. If not, go to step 11.

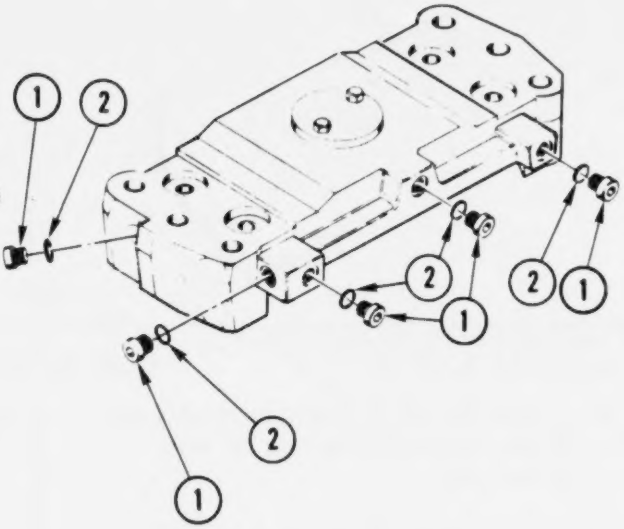


11. INSPECT SPINDLE (5) AND BRAKE ASSEMBLY (6).
    a. Inspect spindle (5) and brake assembly (6) for damage. See page 2-5.
    b. If brake assembly (6) is damaged, go to step 11.1. If not, go to step 12.

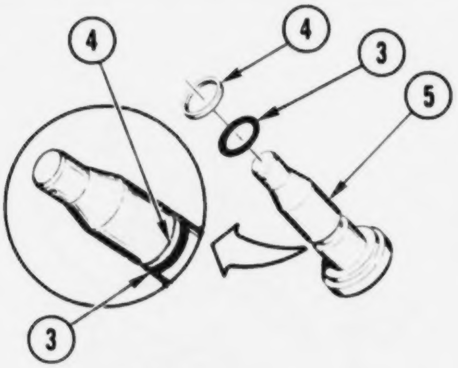
11.1 REPLACE BRAKE ASSEMBLY (6). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE BRAKE ASSEMBLY TO DEPOT. GO TO STEP 13.

12. CLEAN RIGHT-HAND SINGLE DISK BRAKE.
    a. Clean assembly and hardware. See page 2-2.

ASSEMBLE



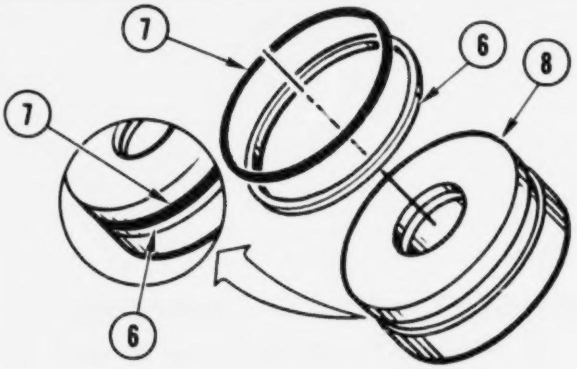
13. INSTALL FIVE PLUGS (1).
    - a. Coat five new preformed packings (2) with transmission oil.
    - b. Install packing (2) on each of five plugs (1).
    - c. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install five plugs (1).
14. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE FIVE PLUGS (1) TO 110-120 in-lb (127-138 cmkg).



CAUTION

Packing retainer must be installed toward narrow end of rod. Damage to equipment can occur.

15. INSTALL NEW PREFORMED PACKING (3) AND NEW PACKING RETAINER (4) ON ROD (5).
    - a. Coat new preformed packing (3) with transmission oil.
    - b. Install packing (3) and new packing retainer (4) on rod (5).



CAUTION

Packing retainer must be installed toward pad end of piston assembly. Damage to equipment can occur.

16. INSTALL NEW PACKING RETAINER (6) AND NEW PREFORMED PACKING (7) ON NEW PISTON ASSEMBLY (8).
    - a. Coat new packing (7) with transmission oil.
    - b. Install new packing retainer (6) and packing (7) on new piston assembly (8).

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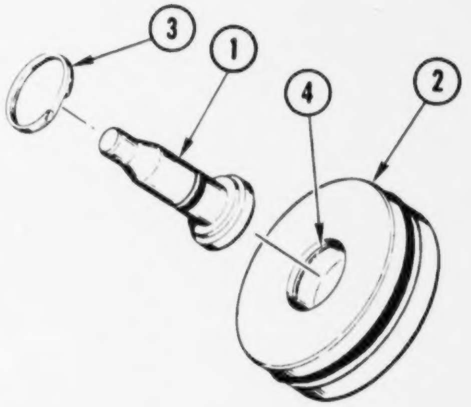
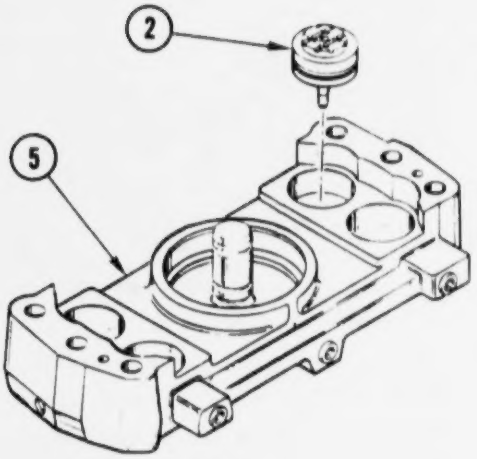


17. INSTALL ROD (1) IN PISTON ASSEMBLY (2).

    a. Install rod (1) in piston assembly (2). Press new retaining ring (3) into groove (4).

18. REPEAT STEPS 15, 16, AND 17 FOR REMAINING THREE RODS (1) AND PISTON ASSEMBLIES (2).



19. INSTALL PISTON ASSEMBLY (2) IN BRAKE ASSEMBLY (5).

    a. Coat piston assembly (2) with transmission oil.

    b. Press piston assembly (2) into brake assembly (5).

20. INSTALL AND SECURE SPRING (6).

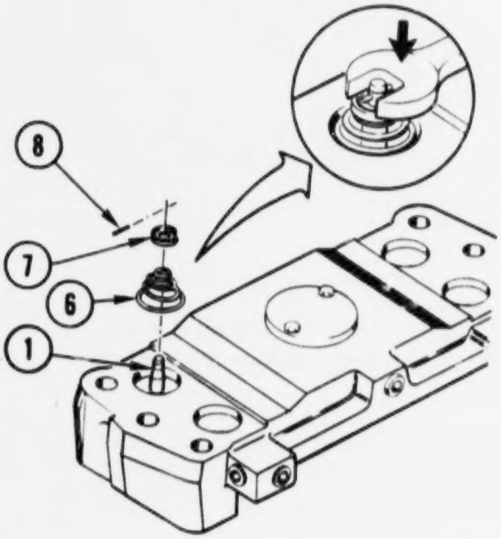
    a. Place spring (6) and collar (7) on rod (1). Install collar with cupped side up.

    b. Hold rod (1) in place. Using 9/16-inch open end wrench, press collar (7) until pin hole in rod (1) is visible.

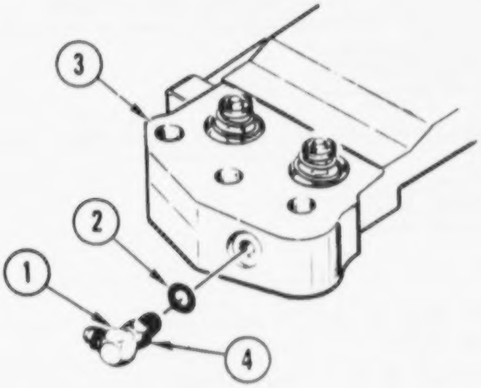
    c. Insert pin (8) through hole in rod (1).

    d. Release pressure on spring (6).

21. REPEAT STEPS 19 AND 20 FOR REMAINING THREE PISTON ASSEMBLIES.



22. INSTALL ELBOW (1) IF REMOVED.
    a. Coat new preformed packing (2) with transmission oil and install on elbow (1).
    b. Screw elbow (1) into brake assembly (3). Hand tighten elbow until captive washer (4) makes firm contact with brake assembly.



END OF TASK

REPLACE FRICTION CLUTCH

DESCRIPTION

This task covers: Remove (page 4-208). Install (page 4-209).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder —
(Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Retaining-ring pliers —
(Item 59, App C)
Torque wrench —
(Item 100, App C)

Materials/Parts:

Transmission oil—(Item 12, App B)
Preformed packing (2)

Personnel Required:

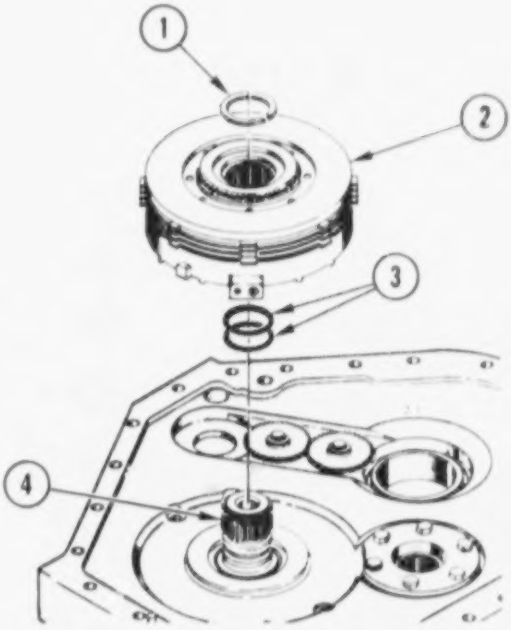
Track Veh Rep 63H10

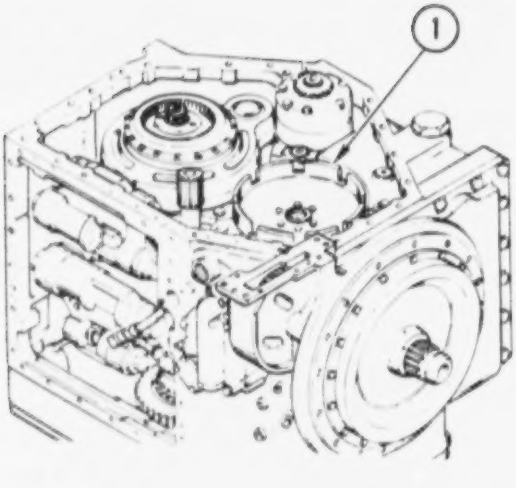
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

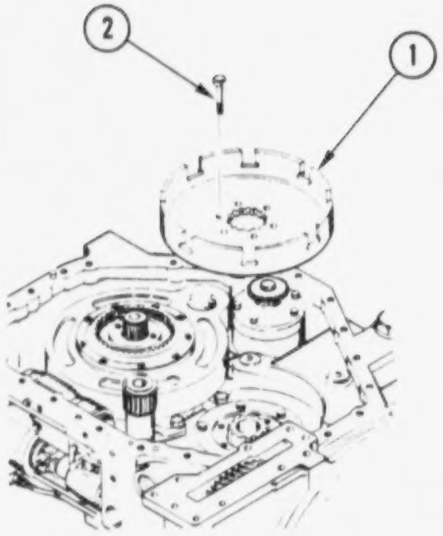
REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
3. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
4. USING RETAINING-RING PLIERS, REMOVE RETAINING RING (1).
   a. Replace retaining ring (1), if damaged.
5. USING PRY BAR, REMOVE FRICTION CLUTCH (2).
6. REMOVE TWO PREFORMED PACKINGS (3) FROM SPLINED SHAFT (4). DISCARD PACKINGS.



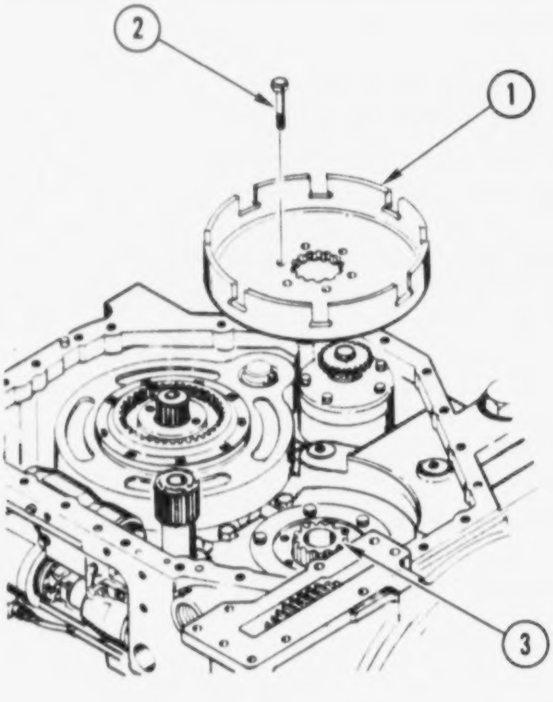


7. INSPECT THIRD RANGE CLUTCH HOUSING (1) FOR DAMAGE.
   a. Inspect clutch housing (1) for damage. See page 2-5.
   b. If clutch housing (1) is damaged, go to step 8. If not, go to step 9.



8. REMOVE CLUTCH HOUSING (1).
   a. Remove six screws (2).
   b. Lift off clutch housing (1).
   c. Replace clutch housing (1).

INSTALL



9. IF CLUTCH HOUSING (1) WAS REMOVED, GO TO STEP 10. IF NOT, GO TO STEP 12.

10. INSTALL NEW CLUTCH HOUSING (1).
    a. Hold clutch housing (1) on gearshaft spline (3) and aline six screw holes.
    b. Install six screws (2).

11. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (2) TO 10-12 ft-lb (1-2 mkg).

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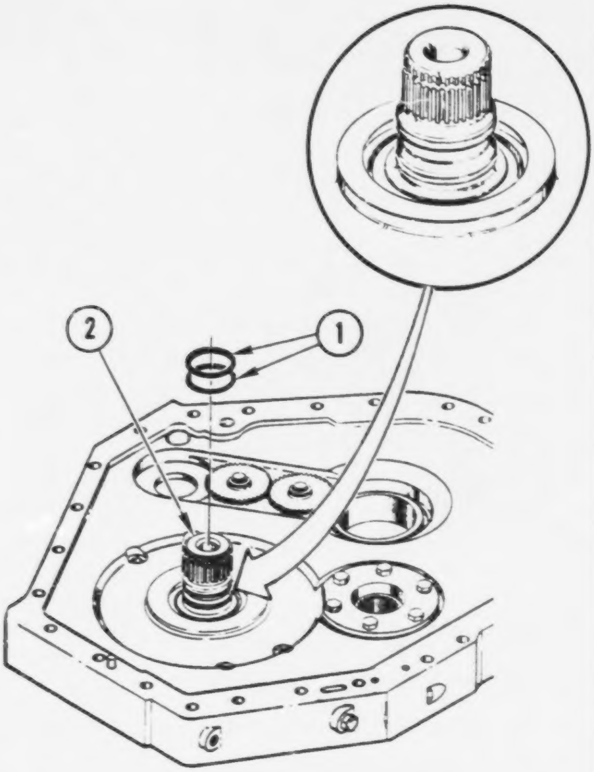
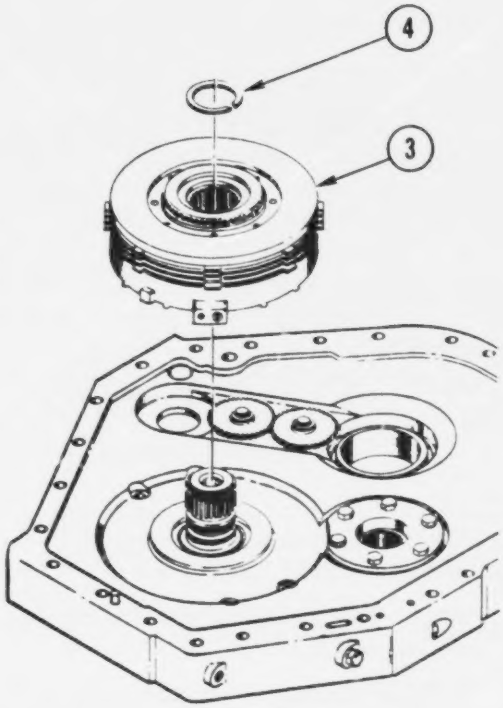




12. COAT TWO NEW PREFORMED PACKINGS (1) WITH TRANSMISSION OIL.

13. INSTALL PACKINGS (1) ON SPLINED SHAFT (2).

14. USING PLASTIC-FACED HAMMER, INSTALL FRICTION CLUTCH (3).

15. USING RETAINING-RING PLIERS, INSTALL RETAINING RING (4).

16. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

17. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

18. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR FRICTION CLUTCH

DESCRIPTION

This task covers: Disassemble (page 4-211). Assemble (page 4-214).

INITIAL SETUP

Tools:

"C" clamp (2) — (Item 18, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inside/outside indicator caliper — (Item 41, App C)
Micrometer caliper set — (Item 52, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench attachment — (Item 79, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)
Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

Transmission oil — (Item 12, App B)
Preformed packing
Friction clutch repair kit

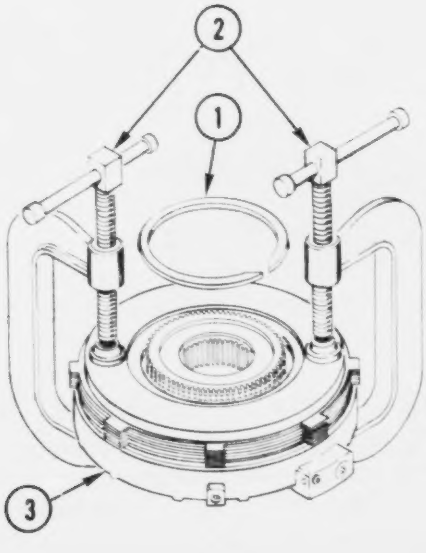
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Friction clutch on workbench. See page 4-208.

DISASSEMBLE



1. REMOVE RETAINING RING (1).
   a. Place two "C" clamps (2) on friction clutch (3) opposite each other.
   b. Tighten two "C" clamps (2) evenly until pressure is relieved on retaining ring (1).
   c. Using retaining-ring pliers, remove retaining ring (1).

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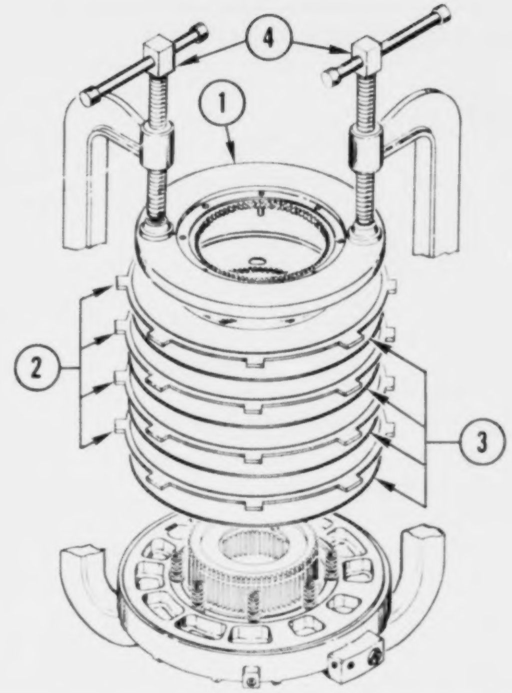
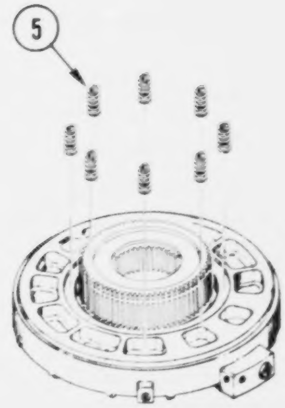


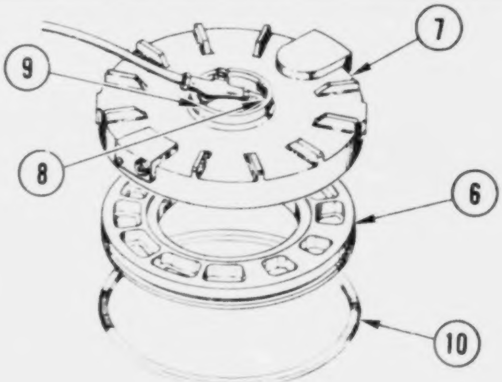
CAUTION

Two "C" clamps are under spring pressure. Use care when removing "C" clamps. Failure to do so can result in loss of parts.

2. REMOVE BACKUP PLATE (1), FOUR CLUTCH FRICTION PLATES (2), AND FOUR CLUTCH SEPARATOR PLATES (3).
   a. Plates must be installed in same order as removed.
   b. Loosen two "C" clamps (4) evenly.
   c. Remove two "C" clamps (4).
   d. Remove backup plate (1), four friction plates (2), and four separator plates (3).



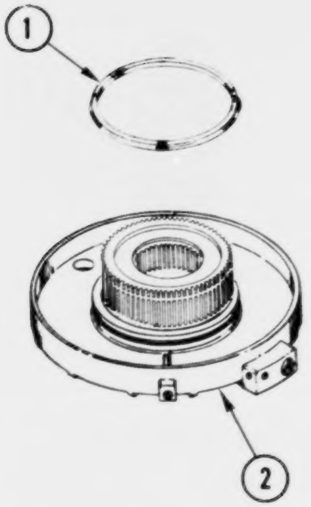
3. REMOVE EIGHT SPRINGS (5).



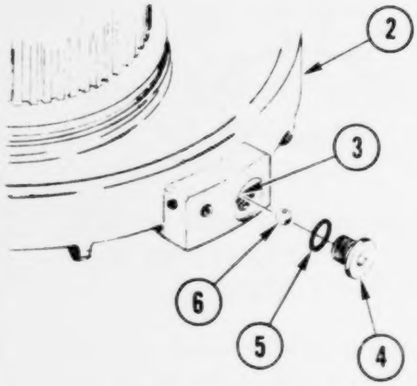
WARNING

Compressed air can injure you and others. Do not aim air at soldiers. Do not use more pressure than 20 psi (138 kPa). Always wear goggles.

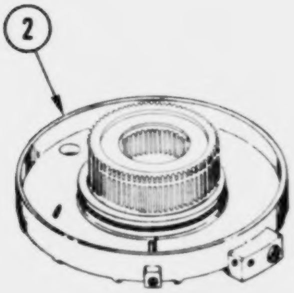
4. SEPARATE THIRD RANGE CLUTCH PISTON (6) FROM HOUSING (7).
   a. Remove piston (6) from housing (7) by applying air pressure to oil port (8) in bushing (9).
   b. Remove and discard preformed packing (10).



5. REMOVE AND DISCARD PREFORMED PACKING (1) FROM HOUSING (2).

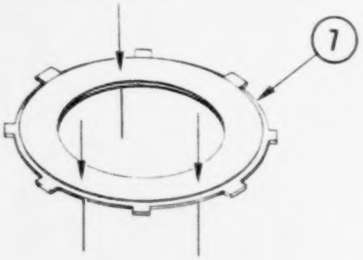


6. INSPECT BEARING BALL SEAT (3).
   a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove machine thread plug (4).
   b. Remove and discard preformed packing (5).
   c. Remove bearing ball (6).
   d. Inspect ball seat (3). Replace housing (2) if ball seat is damaged.



7. CLEAN FRICTION CLUTCH.
   a. Clean housing (2) and hardware. See page 2-2.

8. INSPECT FRICTION CLUTCH.
   a. Inspect housing (2) and hardware. See page 2-5.



9. CHECK FOUR CLUTCH FRICTION PLATES (7).
   a. Using micrometer caliper set, measure thickness at three places. Replace all eight plates if measurement of any plate (7) is less than 0.128 inch (3.25 mm).
   b. Using flat surface and feeler gage, check plate (7) for warpage. Check inside and outside edges in three places.
   c. Replace all eight plates if warpage of any plate (7) is greater than 0.010 inch (0.25 mm).

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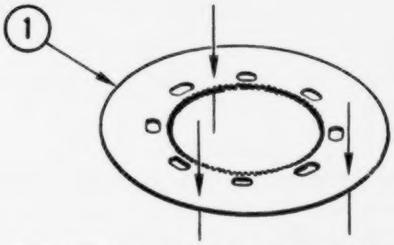
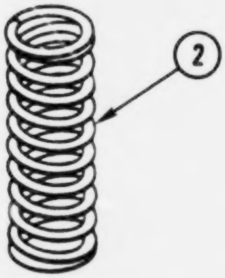
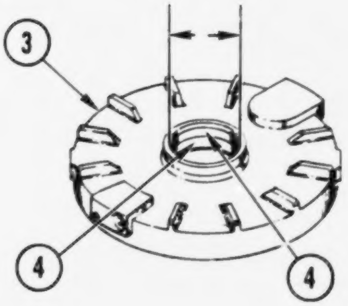


10. IF PLATES WERE NOT REPLACED, GO TO STEP 11. IF PLATES WERE REPLACED, GO TO STEP 12.

11. CHECK FOUR CLUTCH SEPARATOR PLATES (1).
    a. Using flat surface and feeler gage, check plate (1) for warpage. Check inside and outside edges in three places.
    b. Replace all eight plates if warpage of any plate (1) is greater than 0.010 inch (0.25 mm).

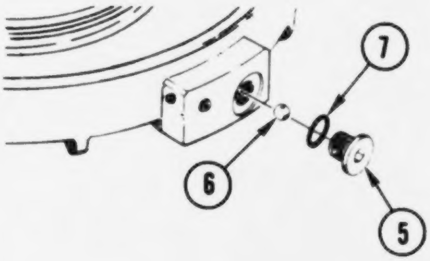


12. CHECK EIGHT SPRINGS (2).
    a. Using indicator caliper, measure free length of each spring (2).
    b. Replace spring (2) if free length is not 1.387-1.437 inches (35.23-36.50 mm).



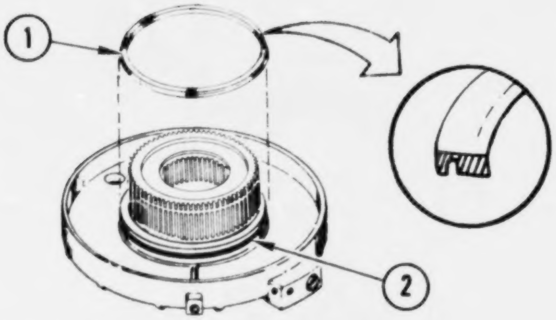
13. CHECK HOUSING ASSEMBLY (3).
    a. Using micrometer caliper set and telescoping gage set, measure two diameters (4).
    b. Replace housing (3) if either diameter measures greater than 2.378 inches (60.40 mm).

ASSEMBLE



14. INSTALL PLUG (5) AND BALL (6).
    a. Install ball (6).
    b. Coat new preformed packing (7) with transmission oil.
    c. Install packing (7) on plug (5).
    d. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, install plug (5).

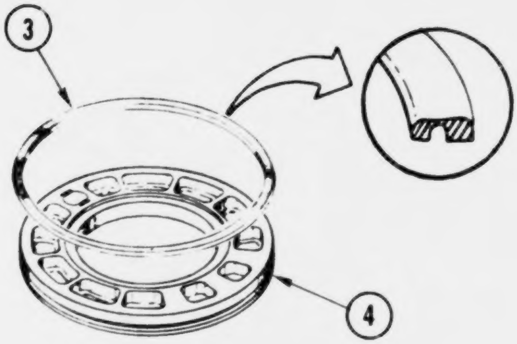
15. USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (5) TO 50-60 in-lb (58-69 cmkg).



16. INSTALL NEW PREFORMED PACKING (1) ON HOUSING (2).

    a. Coat new preformed packing (1) with transmission oil.

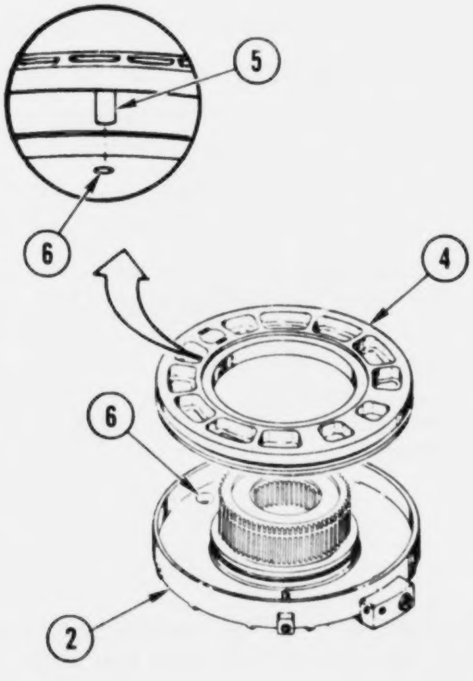
    b. Install packing (1) on housing (2). "V" groove on packing must be facing down.



17. INSTALL NEW PREFORMED PACKING (3).

    a. Coat new preformed packing (3) with transmission oil.

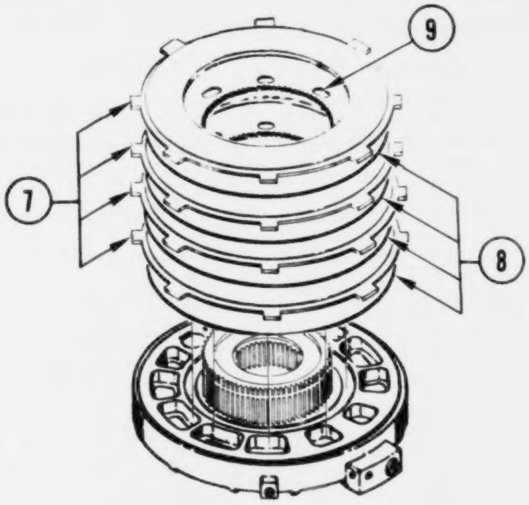
    b. Install packing (3) on piston (4), with "V" groove facing down.



18. INSTALL PISTON (4).

    a. Aline pin (5) on piston (4) with hole (6) in housing (2).

    b. Press piston (4) into housing (2). Be sure piston is fully seated.



19. INSTALL FOUR CLUTCH FRICTION PLATES (7) AND FOUR CLUTCH SEPARATOR PLATES (8).

    a. Coat plates, (7) and (8) with transmission oil.

    b. If installing new friction plates (7) and separator plates (8), use new separator plates PN 11629076-2.

    c. Install four friction plates (7) and four separator plates (8) alternately, beginning with a separator plate.

    d. Aline holes (9) in plates (8).

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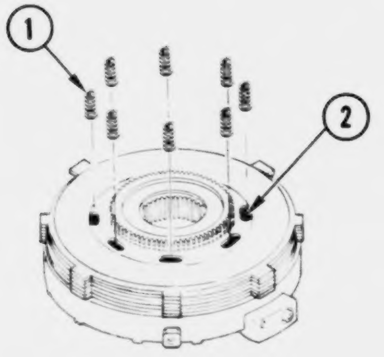
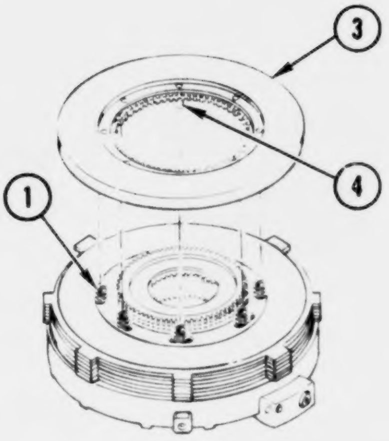


20. INSTALL EIGHT SPRINGS (1).

   a. Install one spring (1) in center of each hole (2).

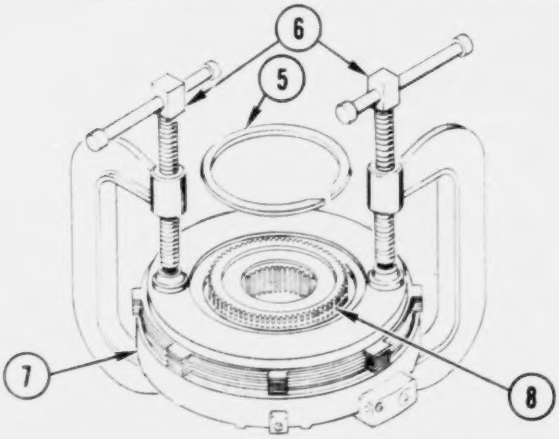


21. INSTALL BACKUP PLATE (3).

   a. Aline eight pins (4) with springs (1) so pins go inside springs when plate (3) is installed.

   b. Center eight pins (4) in eight springs (1).

   c. Install plate (3).



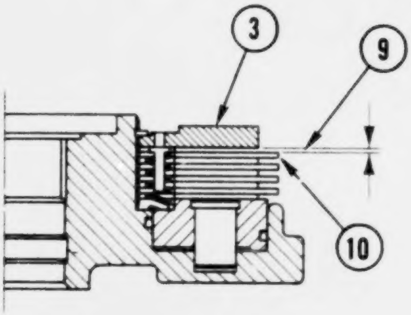
22. INSTALL RETAINING RING (5).

   a. Place two "C" clamps (6) on clutch assembly (7) opposite each other.

   b. Tighten two "C" clamps (6) evenly until retaining ring groove (8) can be seen.

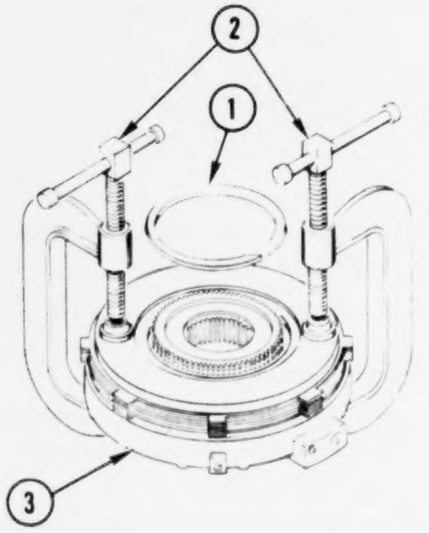
   c. Using retaining-ring pliers, install retaining ring (5).

   d. Remove two "C" clamps (6).



23. MEASURE GAP (9) BETWEEN CLUTCH FRICTION PLATE (10) AND BACKUP PLATE (3).

   a. Check gap (9) in three places. If gap is greater than 0.075 inch (1.90 mm), or less than 0.055 inch (1.39 mm), go to step 24. If gap is between 0.055 inch (1.39 mm) and 0.075 inch (1.90 mm), go to END OF TASK.

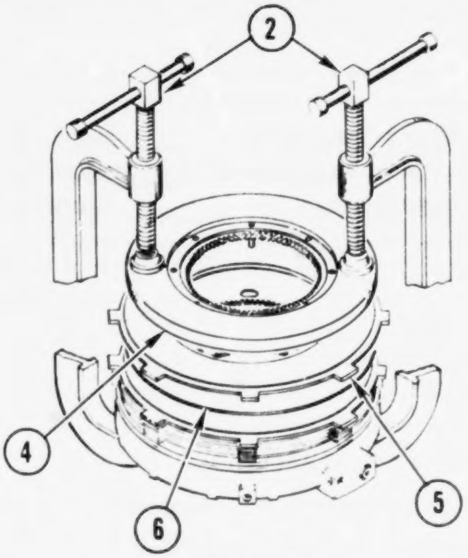


24. REMOVE RETAINING RING (1).

    a. Place two "C" clamps (2) on clutch assembly (3) opposite each other.

    b. Tighten two "C" clamps (2) evenly to relieve pressure on retaining ring (1).

    c. Using retaining-ring pliers, remove retaining ring (1).



CAUTION

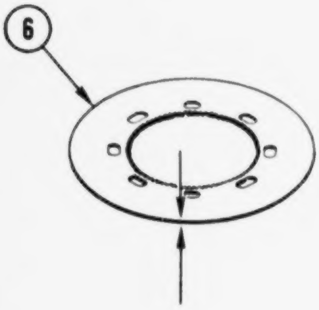
Two "C" clamps are under spring pressure. Use care when removing "C" clamps. Failure to do so can result in loss of parts.

25. REMOVE BACKUP PLATE (4), ONE CLUTCH FRICTION PLATE (5), AND ONE CLUTCH SEPARATOR PLATE (6).

    a. Loosen two "C" clamps (2) evenly.

    b. Remove two "C" clamps (2).

    c. Remove backup plate (4), one friction plate (5), and one separator plate (6).



26. OBTAIN DIMENSION A.

    a. Using micrometer caliper set, measure thickness of clutch separator plate (6) removed in step 25.

    b. Record result as dimension A.

STEP 23 GAP ______ **INCH**
−0.065 **INCH**
STEP 27 DIMENSION B = ______ **INCH**

27. OBTAIN DIMENSION B.

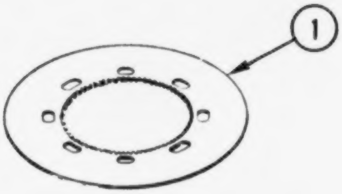
    a. Subtract 0.065 inch (1.65 mm) from gap measurement taken in step 23.

    b. Record result as dimension B.

GO TO NEXT PAGE

STEP 27 DIMENSION B ______ INCH
STEP 26 DIMENSION A +______ INCH
STEP 28 DIMENSION C =______ INCH

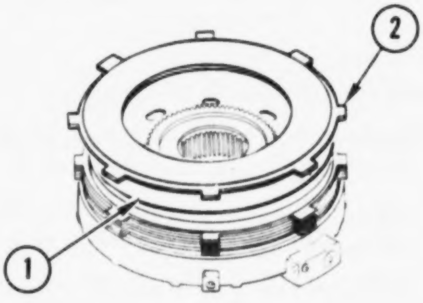
28. OBTAIN DIMENSION C.
    a. Add dimension A to dimension B.
    b. Record result as dimension C.



29. SELECT NEW CLUTCH SEPARATOR PLATE (1) FROM REPAIR KIT.
    a. Select new separator plate (1) that is equal to dimension C ±0.010 inch (0.25 mm), from repair kit.
    b. Replace separator plate (1) removed in step 25 with new separator plate selected in step 29a.

30. INSTALL NEW SEPARATOR PLATE (1) AND FRICTION PLATE (2).
    a. Install new separator plate (1).
    b. Install friction plate (2).

31. GO TO STEP 21.



END OF TASK

Section VII. LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY

TASK INDEX

Task	Page
Replace Left-Hand Intermediate Housing Assembly	4-220
Repair Left-Hand Intermediate Housing Assembly	4-236
Repair Left-Hand Intermediate Mechanical Housing Inserts	4-253
Replace Left-Hand Single Disk Brake	4-255
Repair Left-Hand Single Disk Brake	4-262
Repair Left-Hand Single Disk Brake Housing Inserts	4-268

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-220). Install (page 4-226).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
Crowfoot attachment — (Item 21, App C)
Eyebolt (2) — (Item 27, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Micrometer caliper set —(Item 52, App C)
Output holding fixture — (Item 56, App C)
Retaining-ring pliers —(Item 59, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)
Lifting device and chain with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Lockwire — (Item 5, App B)
Petrolatum — (Item 7, App B)
Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)
Cross shaft shim kit
Lock washer (8)
Preformed packing (2)
Socket head cap screw (2)
Transmission repair kit

Personnel Required:

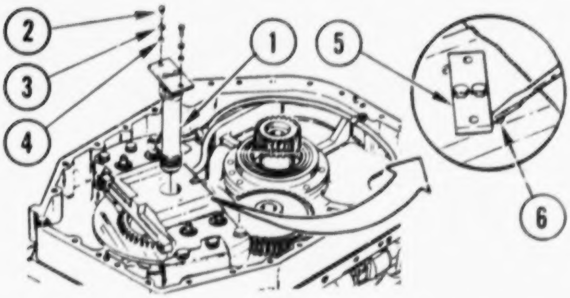
Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

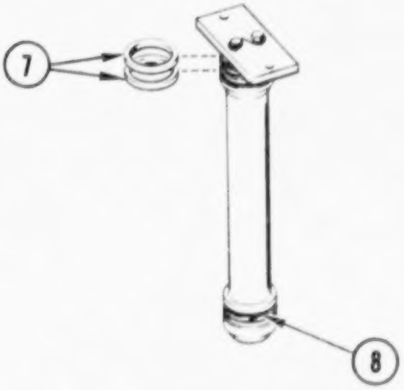
1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.



NOTE

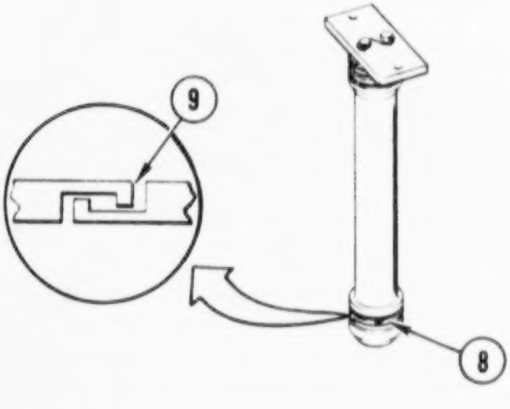
Spur gear and bearing may have been removed. Keep it with this housing.

3. REMOVE SPINDLE ASSEMBLY (1) IF INSTALLED.
   a. Remove two screws (2), washers (3), and sleeve spacers (4).
   b. Rotate spindle cap (5) until it partly covers screw hole (6).
   c. Using screwdriver in screw holes (6), pry up spindle cap (5).
   d. Remove spindle assembly (1).

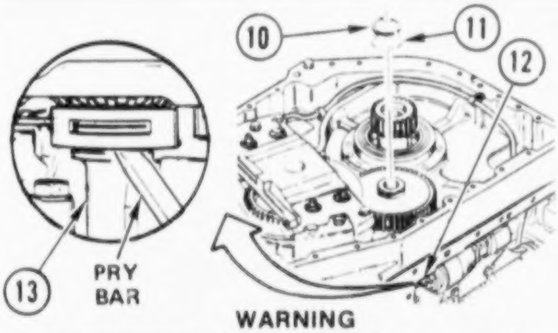


4. REMOVE AND DISCARD TWO PREFORMED PACKINGS (7).

5. INSPECT METAL SEAL RING (8).
   a. Inspect ring (8) for damage. See page 2-5.
   b. If ring (8) is damaged, go to step 6. If not, go to step 7.



6. REMOVE RING (8).
   a. Squeeze ring (8) with fingers until hooks (9) release.
   b. Spread open and remove ring (8). Discard ring.

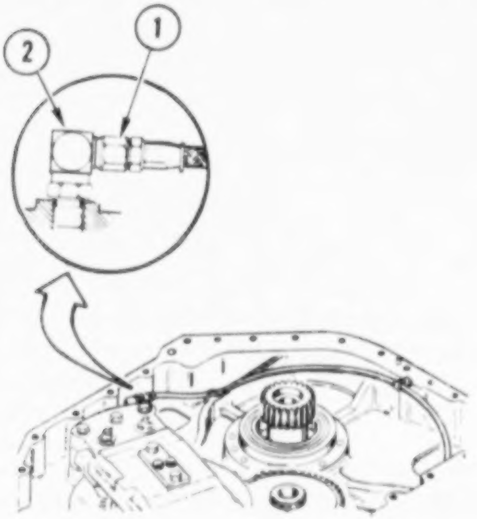


WARNING

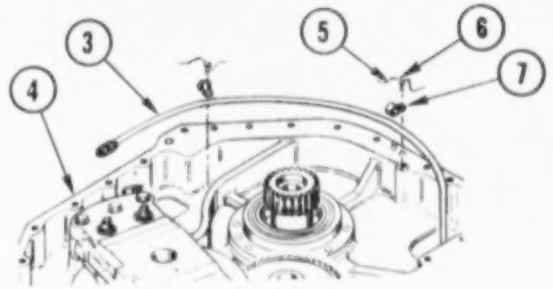
Use care when removing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

7. REMOVE RETAINING RING (10) AND SHIM (11).
   a. (H) Reach in through controller opening (12) and pry up cross shaft (13).
   b. Using retaining-ring pliers, remove retaining ring (10).
   c. Remove shim (11).

GO TO NEXT PAGE



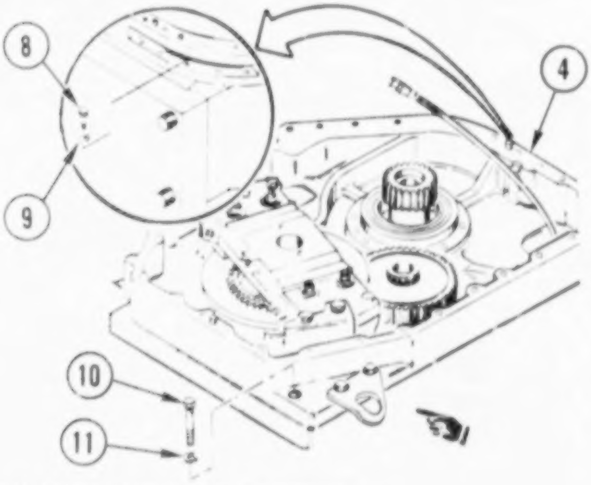
8. DISCONNECT HOSE ASSEMBLY NUT (1) FROM HOSE TO BOSS ELBOW (2).



NOTE

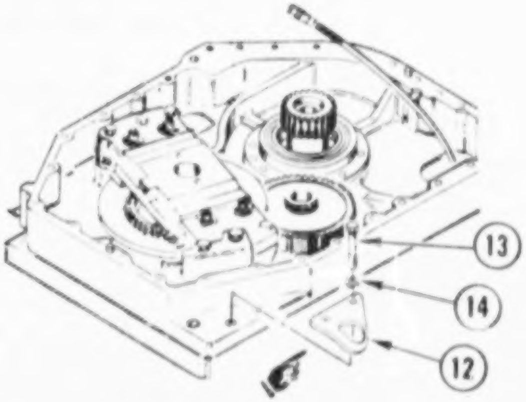
Observe how the hose assembly is routed. It must be put back the same way.

9. RELEASE HOSE ASSEMBLY (3) FROM LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY (4).
   - a. Using wire-twister pliers, remove and discard lockwire (5) from two screws (6) and clamps (7).
   - b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove two screws (6) and clamps (7). Discard screws.

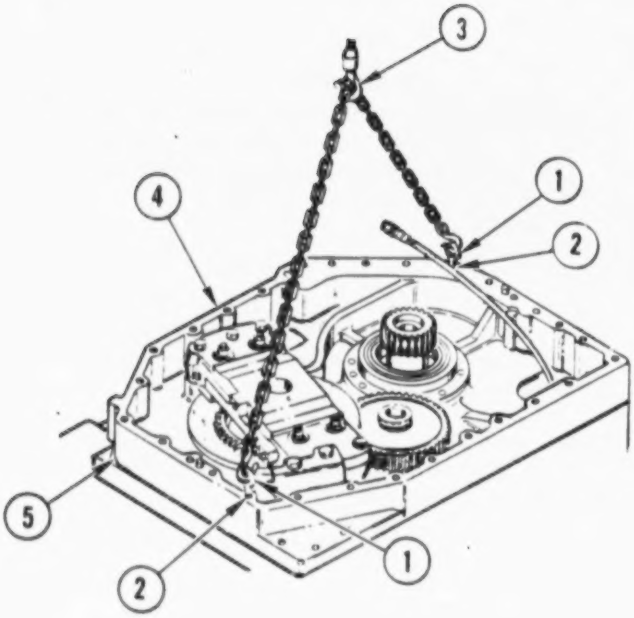


10. REMOVE FIVE SCREWS (8) FROM HOUSING ASSEMBLY (4).
    - a. Remove five screws (8) and lock washers (9). Discard lock washers.

11. REMOVE SCREW (10).
    - a. Remove screw (10) and lock washer (11). Discard lock washer.



12. REMOVE LIFTING EYE (12).
    - a. Remove two screws (13) and lock washers (14). Discard lock washers.
    - b. Remove lifting eye (12).

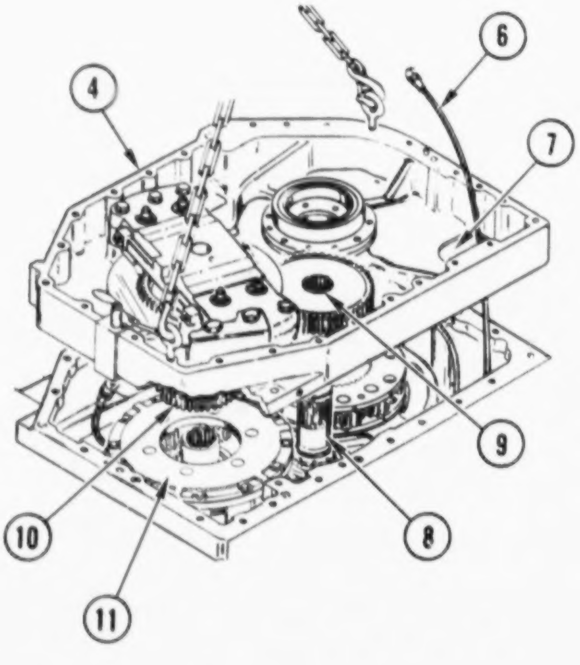


13. INSTALL TWO EYEBOLTS (1) IN TWO THREADED HOLES (2).

14. ATTACH AND SECURE LIFTING DEVICE (3) TO TWO EYEBOLTS (1).

15. LOOSEN HOUSING ASSEMBLY (4).

    a. Use pry slot (5) to loosen housing assembly (4).



CAUTION

Cross shaft must slide free when removing housing assembly. Failure to do so can cause damage to equipment.

16. PARTIALLY RAISE HOUSING ASSEMBLY (4) TO FREE COMPONENTS.

    a. (H) Feed hose assembly (6) through hole (7). Repairer lift housing assembly (4) evenly 1/4 inch at a time. Do not allow cross shaft (8) to stick in spur gear (9).

    b. Inspect that spur gear cluster (10) is not stuck to housing assembly (4).

    c. If spur gear cluster (10) is stuck to housing (4), remove it and place in positive clutch (11).

GO TO NEXT PAGE

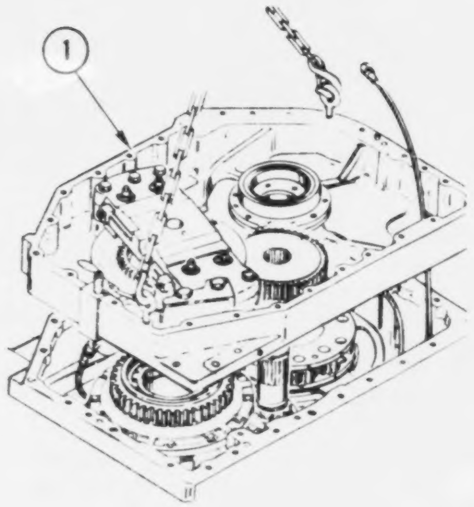
WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

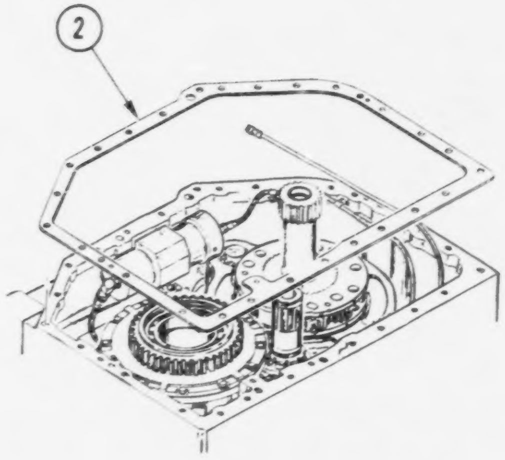
CAUTION

Hose assembly must be fed through opening while lifting housing assembly to prevent damage to hose assembly.

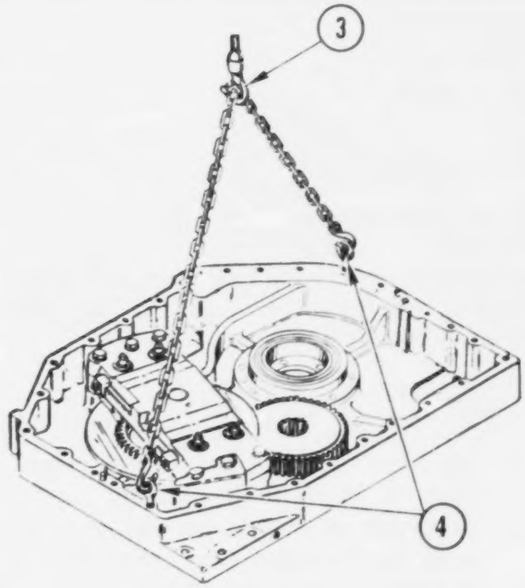
Cross shaft must slide free when removing housing assembly. Failure to do so can cause damage to equipment.



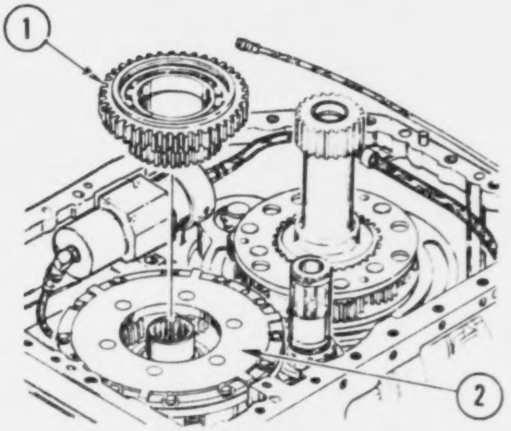
17. EVENLY LIFT OFF HOUSING ASSEMBLY (1).
    a. Place housing assembly (1) on workbench.



18. REMOVE AND DISCARD LEFT-HAND MAIN HOUSING GASKET (2).



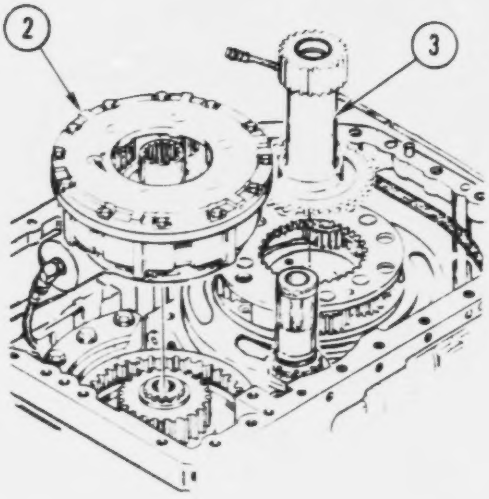
19. REMOVE LIFTING DEVICE (3) AND TWO EYEBOLTS (4).



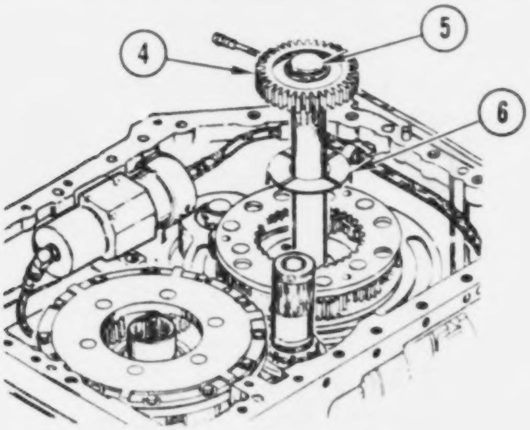
20. INSPECT MAIN HOUSING INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

21. REMOVE SPUR GEAR CLUSTER (1) FROM POSITIVE CLUTCH (2). KEEP WITH HOUSING ASSEMBLY.

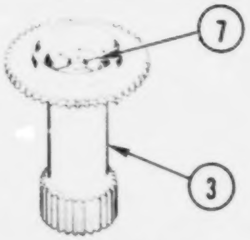
22. IF NO MORE WORK IS REQUIRED ON MAIN HOUSING ASSEMBLY OR TRANSMISSION HAS TO BE TURNED, GO TO STEP 23. IF MORE WORK IS REQUIRED, GO TO STEP 28.



23. REMOVE POSITIVE CLUTCH (2), AND SPUR GEARSHAFT (3). KEEP WITH HOUSING ASSEMBLY.



24. REMOVE SECOND RANGE SPUR GEAR (4) WITH STRAIGHT SHAFT (5) AND THRUST WASHER BEARING (6). KEEP PARTS WITH HOUSING ASSEMBLY.

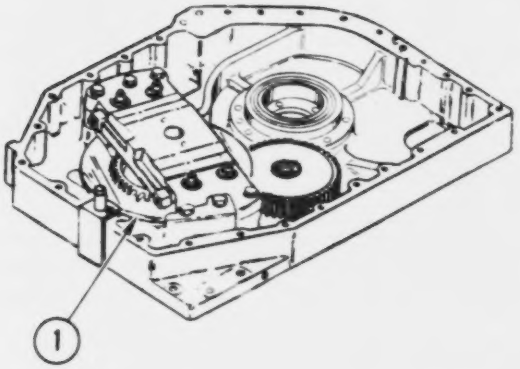


25. INSPECT THRUST WASHER BEARING (7) FOR DAMAGE. See page 2-5.
    a. If bearing (7) is damaged, go to step 26. If not, go to step 27.

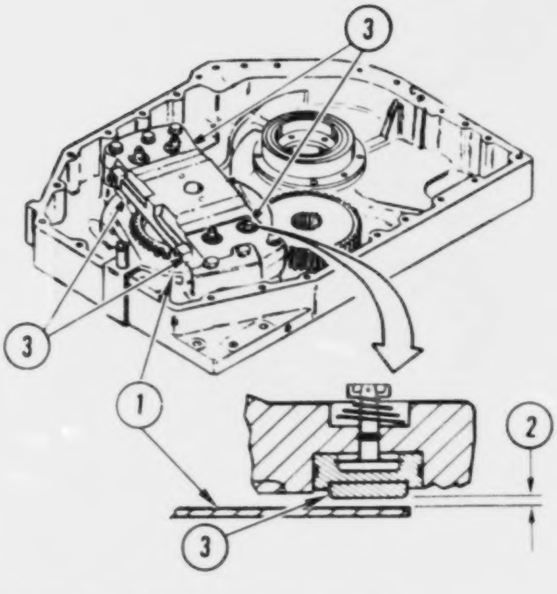
26. REPAIR SPUR GEARSHAFT, page 4-400.

27. PLACE SPUR GEARSHAFT (3) WITH LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY.

GO TO NEXT PAGE



28. INSPECT CLUTCH DISK (1) FOR DAMAGE. See page 2-5.
    a. If disk (1) is damaged, go to step 30. If not, go to step 29.



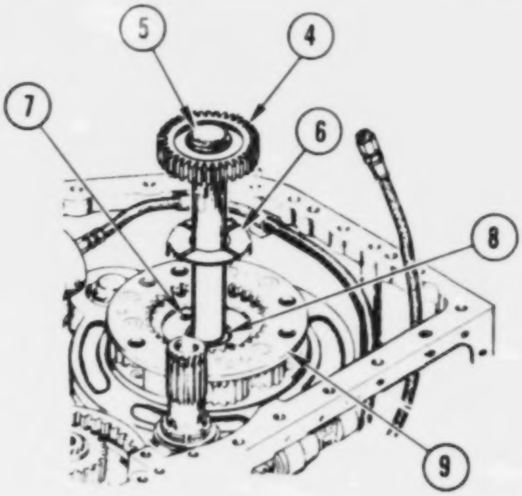
29. CHECK CLEARANCE (2) OF CLUTCH DISK (1).
    a. Measure clearance (2) between clutch disk (1) and four brake pads (3).
    b. If clearance (2) is 0.021-0.060 inch (0.53-1.52 mm), go to step 31. If not, go to step 30.

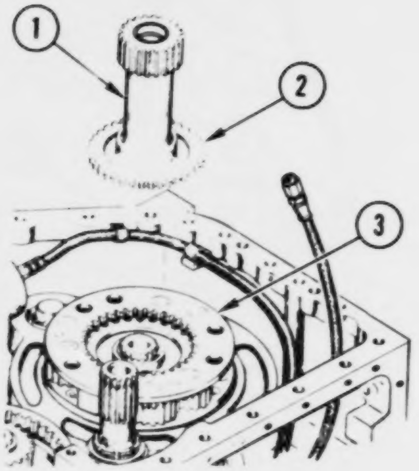
30. REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.

INSTALL

NOTE
When installing parts with splines or gear teeth, make sure that mating parts mesh properly.

31. INSTALL SPUR GEAR (4) WITH STRAIGHT SHAFT (5) AND THRUST WASHER BEARING (6) IF REMOVED.
    a. Install bearing (6). Two tabs on bearing go into two holes (7) in left-hand hydraulic assembly (8).
    b. Install gear (4) with straight shaft (5). Gear goes all the way into differential carrier assembly (9).

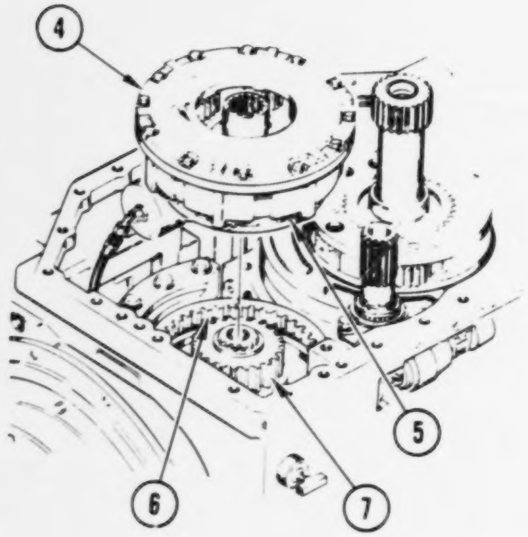




32. INSTALL SPUR GEARSHAFT (1) IF REMOVED.

    a. Aline gear teeth (2) of spur gearshaft (1) with teeth on differential carrier assembly (3).

    b. Install spur gearshaft (1).



33. INSTALL POSITIVE CLUTCH (4) IF REMOVED.

    a. Turn clutch (4) until planetary gears (5) mesh with ring gear (6) and spur gear (7). Clutch will slide into place.

WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

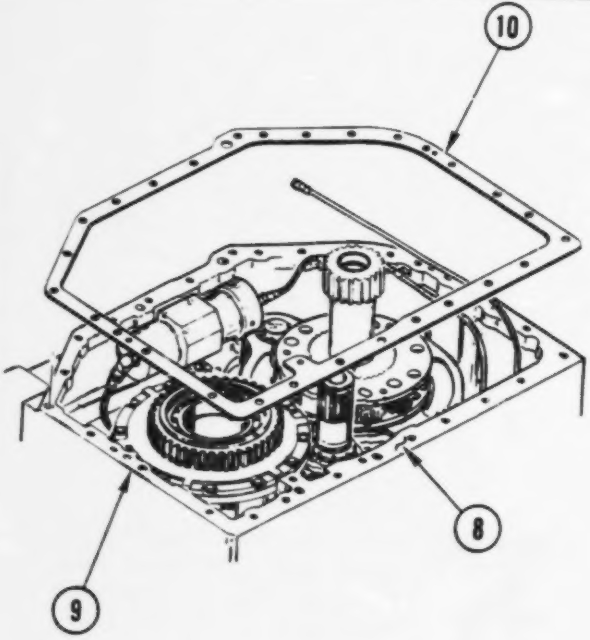
34. CLEAN GASKET MOUNTING SURFACE (8) ON MAIN HOUSING (9).

    a. Use wiping rag dampened with cleaning solvent.

35. INSTALL NEW GASKET (10).

    a. Apply petrolatum to gasket mounting surface (8) on main housing (9).

    b. Install new gasket (10) on main housing (9).



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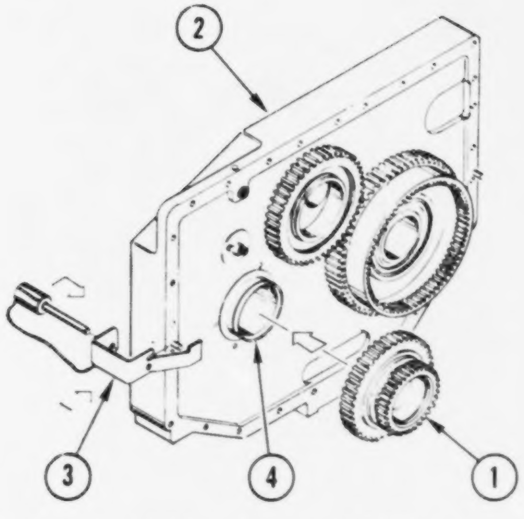
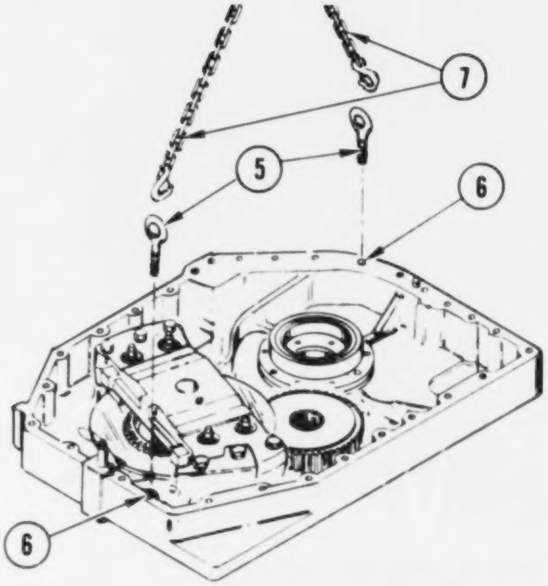
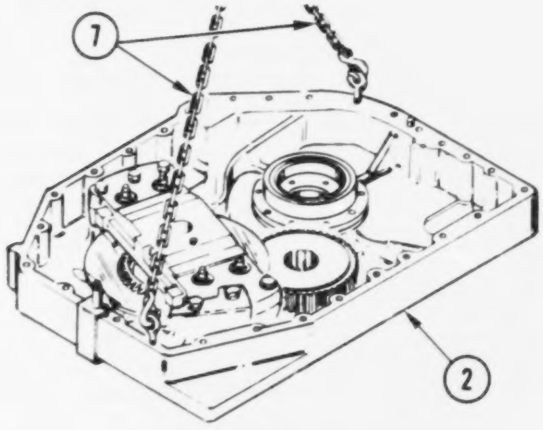


36. INSTALL SPUR GEAR CLUSTER (1) ON HOUSING ASSEMBLY (2).
    a. Using output holding fixture (3), lock gear (1) to output bearing support (4).
    b. Repairer and helper turn housing assembly (2) top side up.



37. INSTALL TWO EYEBOLTS (5) IN THREADED HOLES (6).

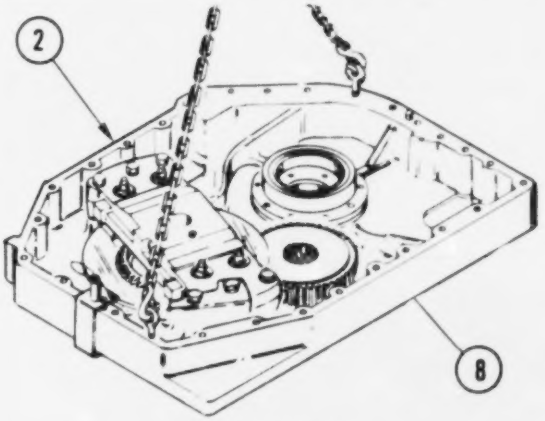
38. ATTACH AND SECURE LIFTING DEVICE (7) TO TWO EYEBOLTS (5).



WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

39. USING LIFTING DEVICE (7) LIFT HOUSING ASSEMBLY (2).



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

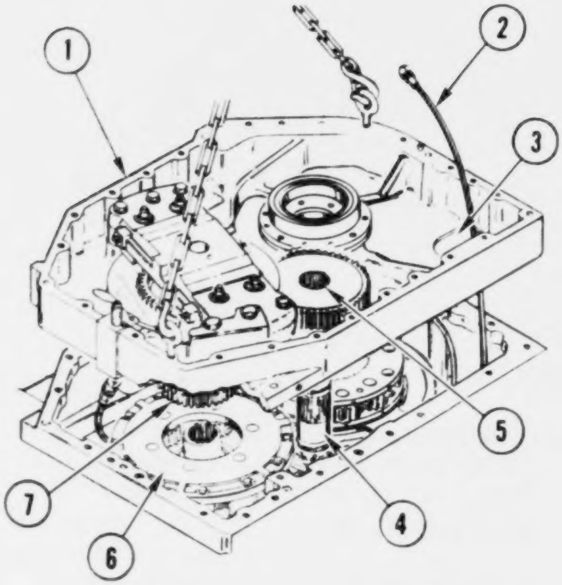
40. CLEAN GASKET MOUNTING SURFACE (8) ON HOUSING ASSEMBLY (2).
    a. Use wiping rag dampened with cleaning solvent.

CAUTION

All parts must mate. Do not allow kinking or bending of hose assembly. Equipment can be damaged.

Do not deform gasket with output holding fixture. Equipment can be damaged.

41. PARTIALLY LOWER HOUSING ASSEMBLY (1) TO ALINE COMPONENTS AND HOSE ASSEMBLY (2).
    a. (H) Feed hose assembly (2) through hole (3). Hold hose assembly while lowering housing assembly (1).
    b. Aline cross shaft (4) with splined hole (5).
    c. Aline positive clutch (6) with spur gear cluster (7).



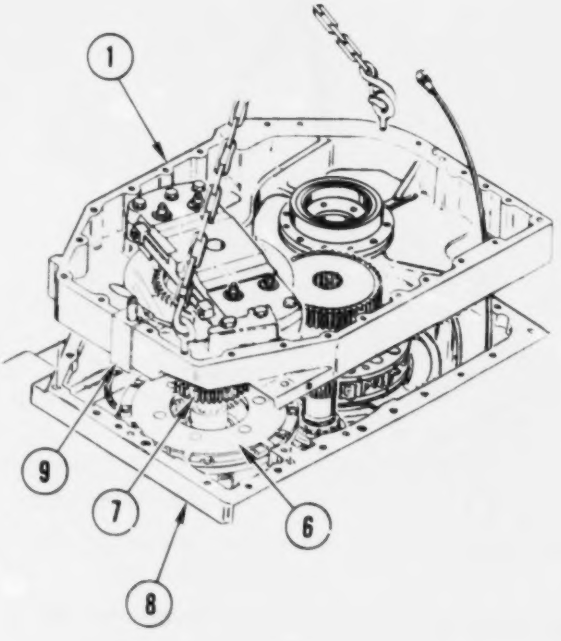
CAUTION

All parts must mate. Do not allow kinking or bending of hose assembly. Equipment can be damaged.

Do not deform gasket with output holding fixture. Equipment can be damaged.

42. LOWER HOUSING ASSEMBLY (1) 1/4 INCH AT A TIME UNTIL SPUR GEAR CLUSTER (7) MESHES WITH POSITIVE CLUTCH (6).

43. LOWER HOUSING ASSEMBLY (1) 1/4 INCH AT A TIME UNTIL HOUSING ASSEMBLY IS 1/2 INCH FROM MAIN HOUSING (8). REMOVE FIXTURE (9).



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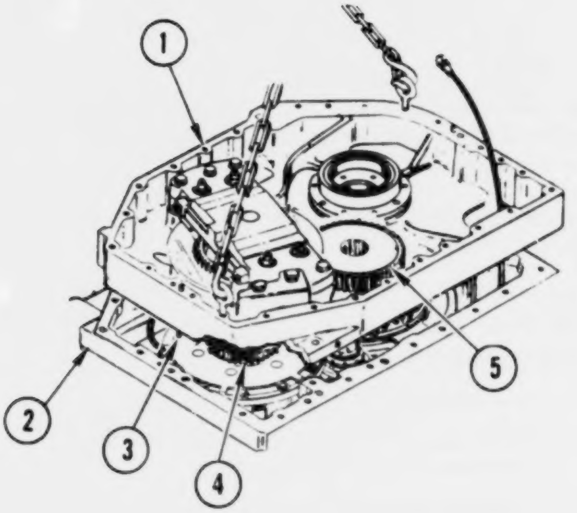
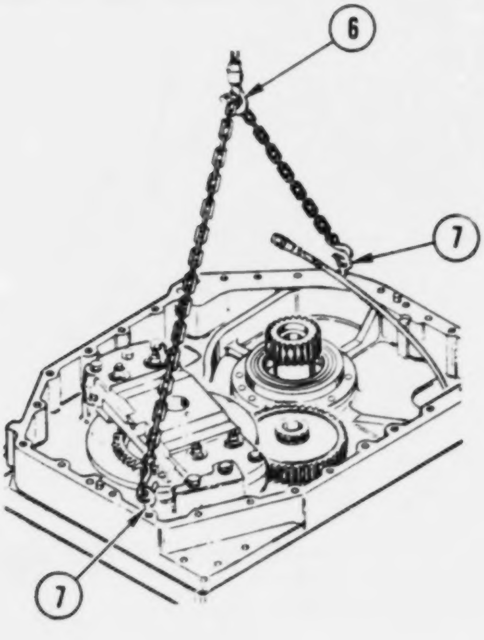
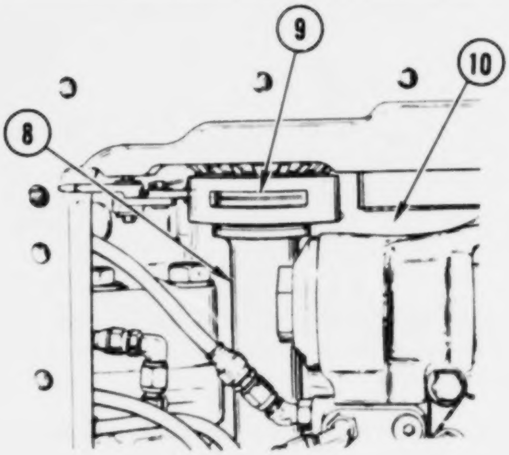


44. LOWER HOUSING ASSEMBLY (1) ONTO MAIN HOUSING (2). ALINE TWO PINS (3) WITH PIN HOLES IN HOUSING (2).

45. ROTATE SPUR GEAR CLUSTER (4) BY TURNING GEAR (5) TO FULLY SEAT HOUSING ASSEMBLY (1).



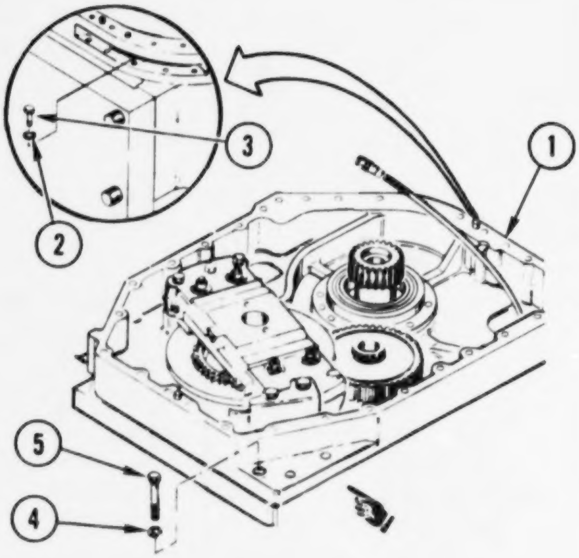
46. REMOVE LIFTING DEVICE (6) AND EYEBOLTS (7).



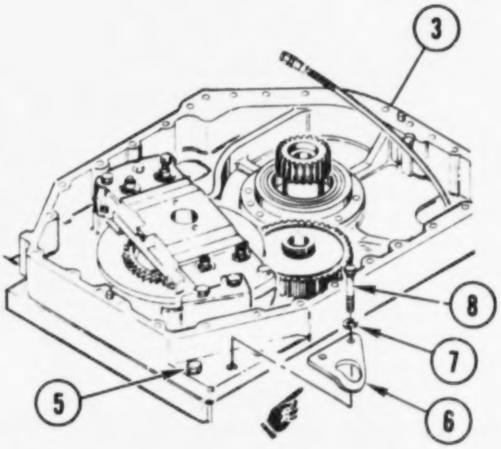
CAUTION

Cross shaft slot must face controller opening. Failure to do so can cause damage to equipment.

47. POSITION CROSS SHAFT (8).
    a. Position cross shaft (8) so that cross shaft slot (9) faces out when viewed through controller opening (10).

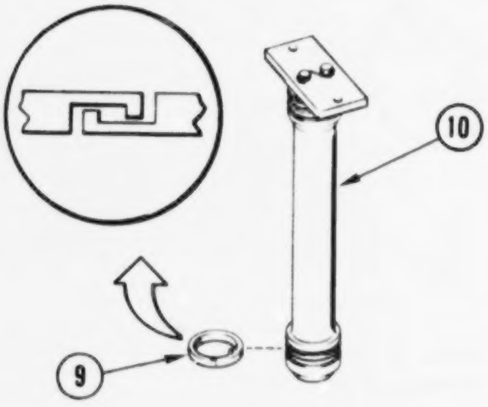


48. SECURE HOUSING ASSEMBLY (1).
    a. Install five new lock washers (2) and 1 1/2-inch screws (3).
    b. Install new lock washer (4) and 1 3/4-inch screw (5).



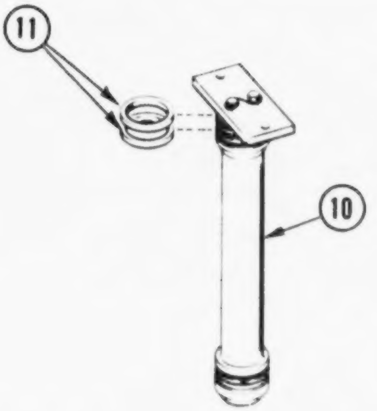
49. INSTALL LIFTING EYE (6).
    a. Install two new lock washers (7) ana 2-inch screws (8).

50. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/8-INCH CROWFOOT, TORQUE EIGHT SCREWS (3), (5), AND (8) TO 40-45 ft-lb (6 mkg).



51. IF RING (9) WAS REMOVED, GO TO STEP 52. IF NOT, GO TO STEP 53.

52. INSTALL NEW RING (9).
    a. Coat new ring (9) with petrolatum.
    b. Install ring (9) on spindle assembly (10).
    c. Hook ring (9) by squeezing together with fingers.



53. INSTALL TWO NEW PREFORMED PACKINGS (11).
    a. Coat two new preformed packings (11) with transmission oil.
    b. Install two new packings (11) on spindle assembly (10).

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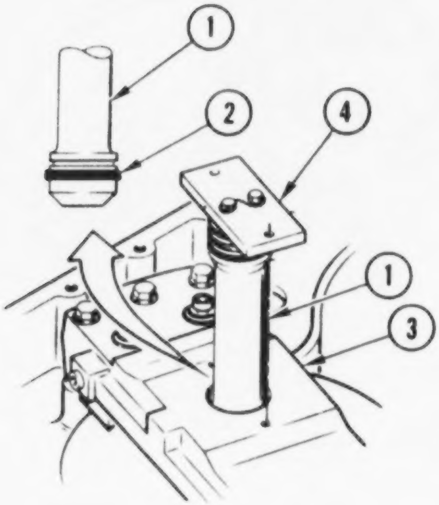
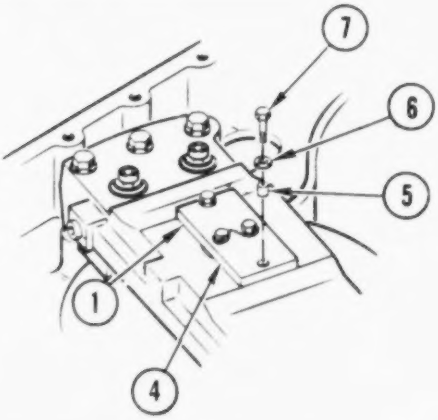


CAUTION

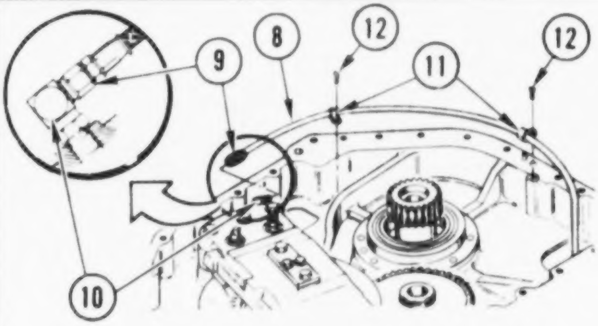
Do not force spindle assembly into brake. Metal seal ring can be damaged.

54. INSTALL SPINDLE ASSEMBLY (1).
    a. Center ring (2) on spindle assembly (1).
    b. Insert spindle assembly (1) into brake (3).
    c. Aline screw holes in spindle plate (4) with screw holes in brake (3).



55. SECURE SPINDLE ASSEMBLY (1).
    a. Install two spacers (5) in two holes in spindle plate (4).
    b. Install two washers (6) and screws (7) and tighten evenly.

56. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (7) TO 10-12 ft-lb (1-2 mkg).

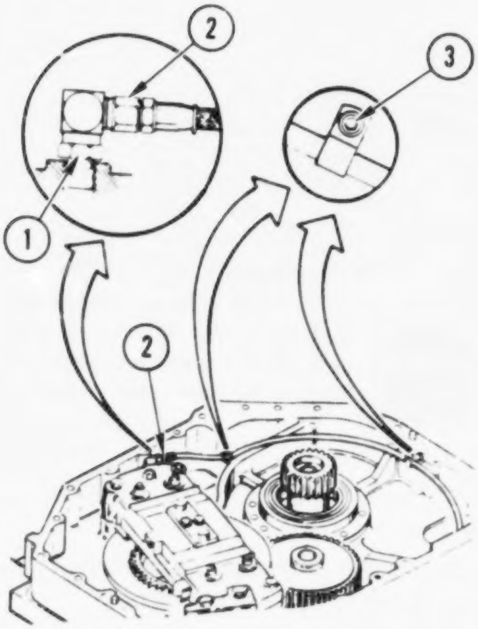


CAUTION

Kinks or bends in hose assembly can cause damage to equipment.

Hose assembly must be routed in same way as in removal. Hose must be clear of sharp or moving objects. Hose assembly can be damaged.

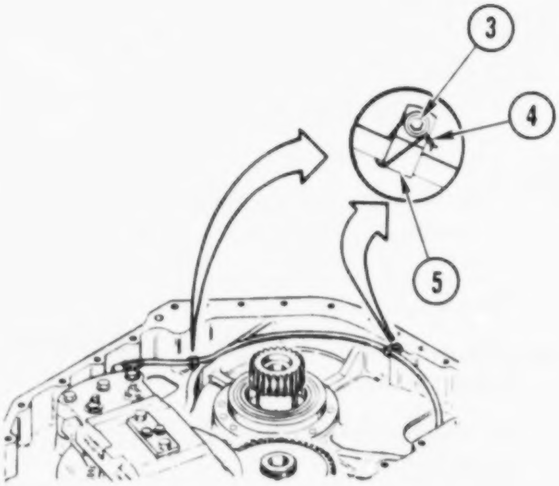
57. SECURE HOSE ASSEMBLY (8).
    a. Connect hose nut (9) to elbow (10).
    b. Install two clamps (11) and new screws (12).
    c. Position hose assembly (8).



58. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ELBOW NUT (1) TO 125-135 in-lb (144-155 cmkg).

59. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (2) TO 125-135 in-lb (144-155 cmkg).

60. USING 3/8-INCH DRIVE TORQUE WRENCH, AND 5/32-INCH HEX SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (3) TO 35-45 in-lb (40-52 cmkg).



61. USING WIRE-TWISTER PLIERS, INSTALL TWO NEW LOCKWIRES (4) IN SCREWS (3) AND AROUND CLAMPS (5).

62. IF RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY AND RIGHT-HAND OUTPUT HOUSING ARE INSTALLED, GO TO STEP 65. IF NOT, GO TO STEP 63.

63. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

64. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

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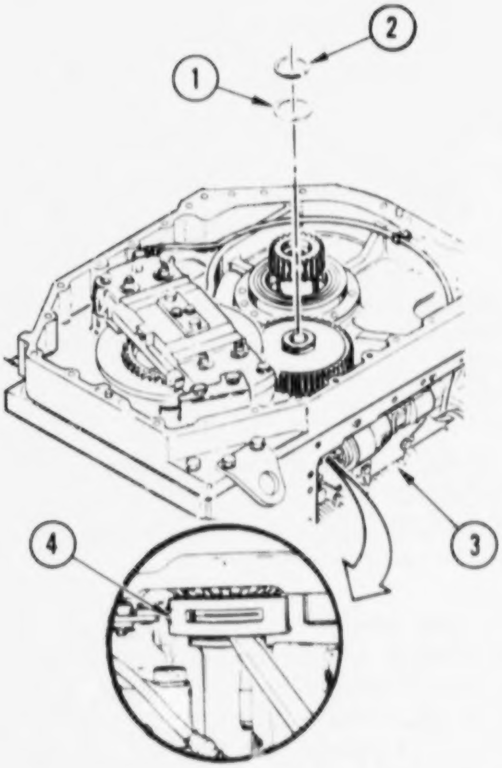
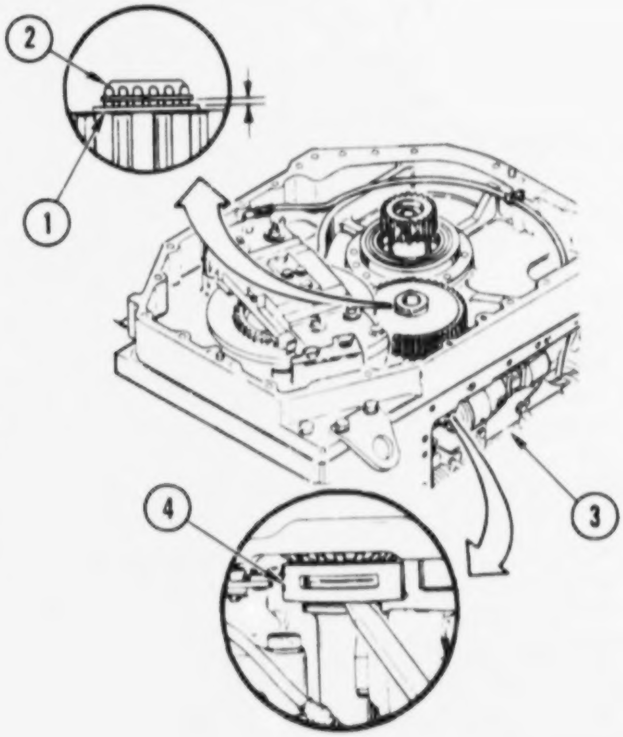


WARNING

Use care when installing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

65. INSTALL SHIM (1) AND RETAINING RING (2).
    a. (H) Reach in through controller opening (3) and pry up cross shaft (4).
    b. Install shim (1).
    c. Using retaining-ring pliers, install retaining ring (2).

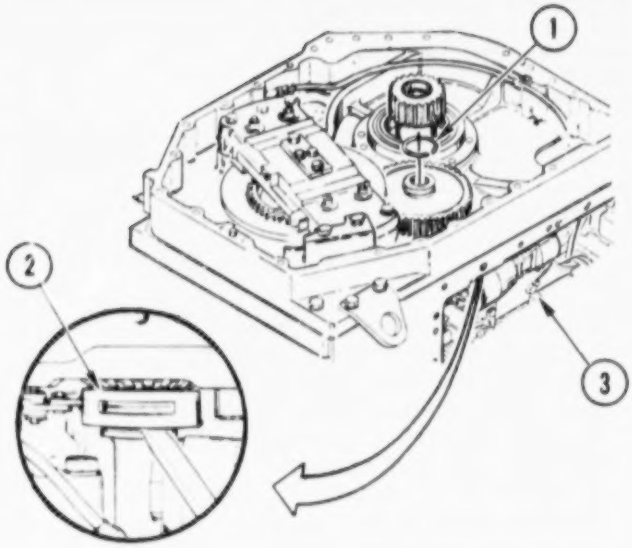


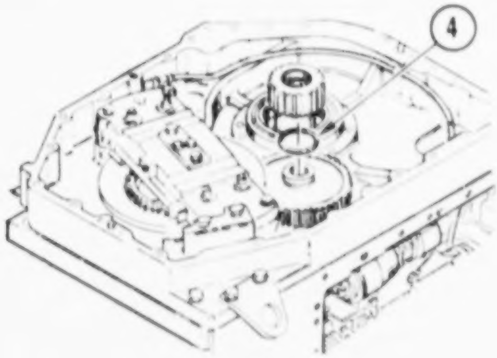
66. MEASURE GAP BETWEEN RETAINING RING (2) AND SHIM (1).
    a. (H) Pry up cross shaft (4) through controller opening (3).
    b. Measure gap between retaining ring (2) and shim (1). Lower cross shaft (4).
    c. If gap is 0.028-0.037 inch (0.71-0.94 mm), go to step 71. If not, go to step 67.

WARNING

Use care when removing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

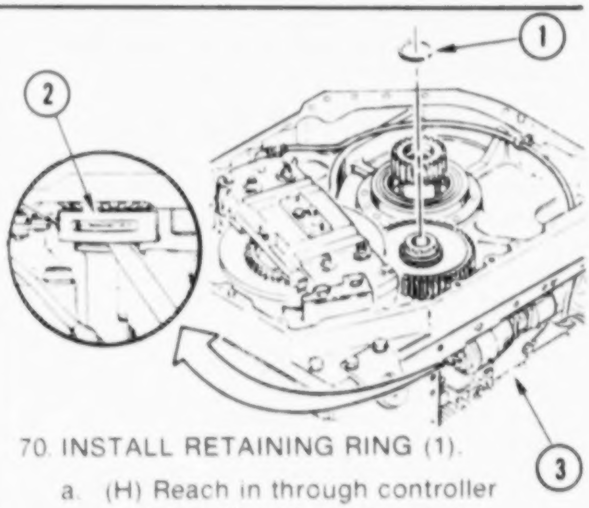
67. REMOVE RETAINING RING (1).
    a. (H) Pry up cross shaft (2) through controller opening (3).
    b. Using retaining-ring pliers, remove retaining ring (1).





68. SELECT NEW SHIM (4) FROM CROSS SHAFT SHIM KIT.
    a. Using micrometer caliper set, select new shim (4) from shim kit that will give a gap of 0.028-0.037 inch (0.71-0.94 mm).

69. INSTALL NEW SHIM (4).



70. INSTALL RETAINING RING (1).
    a. (H) Reach in through controller opening (3) and pry up cross shaft (2).
    b. Using retaining-ring pliers, install retaining ring (1).
    c. Go to step 66.

71. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

72. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-236). Assemble (page 4-248).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing installer — (Item 6, App C)
Bearing installer — (Item 7, App C)
Bearing installer — (Item 8, App C)
Bearing installer — (Item 10, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Inside/outside indicator caliper — (Item 41, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper-set — (Item 52, App C)
Micrometer depth gage — (Item 54, App C)
Retaining-ring pliers — (Item 59, App C)
Retaining-ring pliers — (Item 61, App C)
Slip-joint pliers - (Item 71, App C)
Socket wrench attachment — (Item 79, App C)
Socket wrench attachment — (Item 81, App C)
Socket wrench set — (Item 87, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)

Tools: (cont)

Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Wood block (2) — (Item 3, App D)
Disk brake parts kit
Preformed packing (2)
Preformed packing (2)
Oil lube gasket

Personnel Required:

Track Veh Rep 63H10
Helper (H)

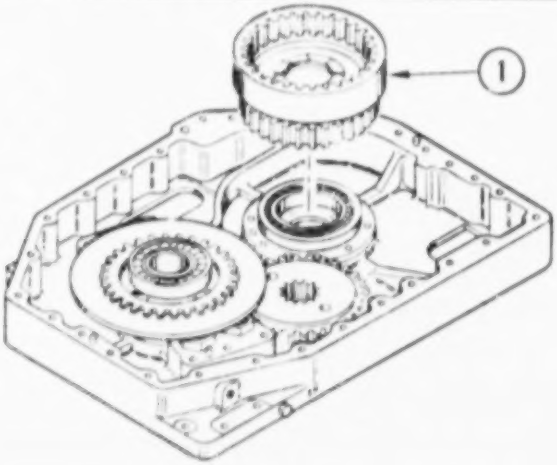
References:

TM 9-214

Equipment Conditions:

Left-hand intermediate housing assembly on workbench. See page 4-220.

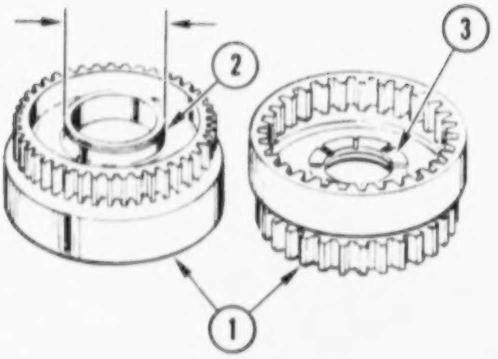
DISASSEMBLE



1. REMOVE LEFT-HAND SINGLE DISK BRAKE. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.

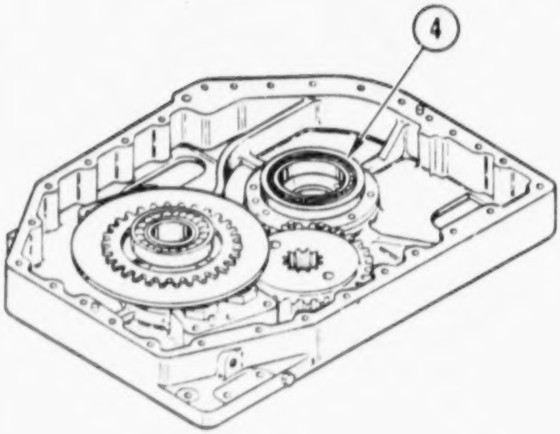
2. REMOVE SPUR GEAR (1).

   a. Lift off gear (1).

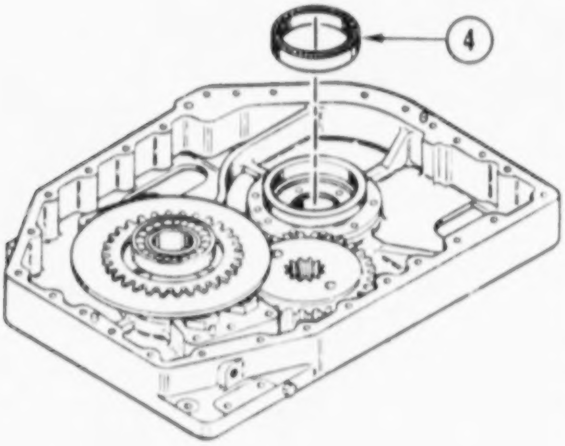


NOTE
Minor heat cracks on thrust washer are normal and are not considered as damage.

3. CHECK GEAR (1).
   a. Using indicator caliper, measure outside diameter of inner hub (2).
   b. Replace gear (1) if measurement is less than 4.3287 inches (109.949 mm).
   c. Inspect thrust washer (3). Replace gear (1) if washer is damaged.

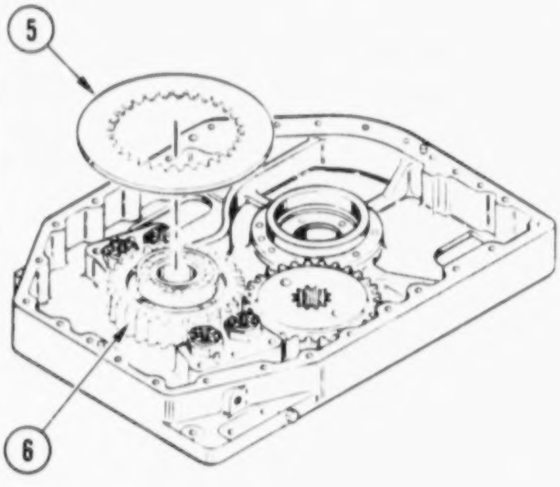


4. INSPECT BALL BEARING (4).
   a. Inspect bearing (4) for damage. See TM 9-214.
   b. If bearing (4) is damaged, go to step 5. If not, go to step 6.



NOTE
Bearing may be loose enough to remove by hand.

5. REMOVE BEARING (4).
   a. Using mechanical puller kit, remove and discard bearing (4).



6. REMOVE CLUTCH DISK (5) FROM SPUR GEARSHAFT (6).

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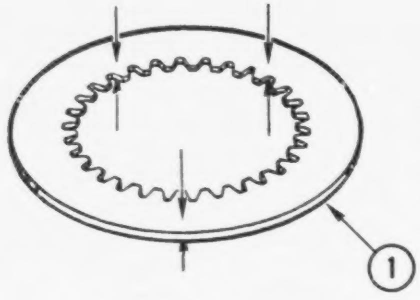
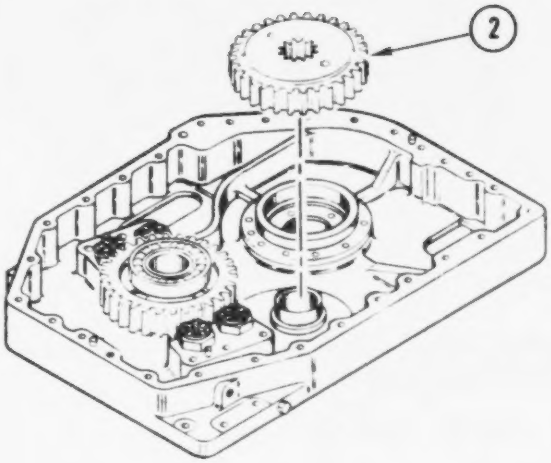
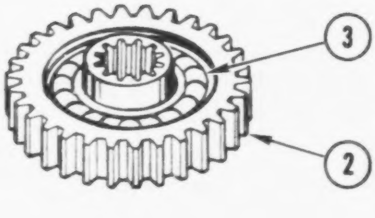


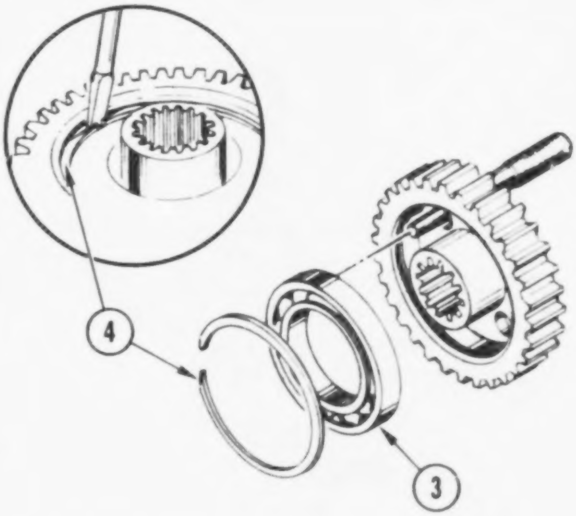
7. CHECK DISK (1).
    a. Using micrometer caliper set, measure thickness of disk (1) in three places.
    b. Replace disk (1) if thickness is less than 0.150 inch (3.81 mm).
    c. Using flat surface and feeler gage, check disk (1) for warpage. Check inside and outside edges in three places.
    d. Replace disk (1) if warpage is greater than 0.010 inch (0.25 mm).



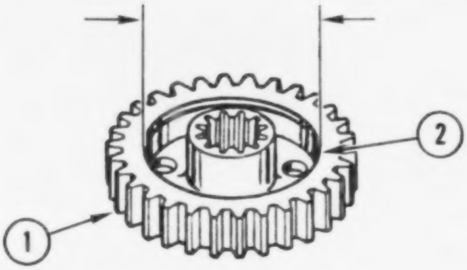
8. REMOVE CROSS SHAFT SPUR GEAR (2).
    a. Using pry bar, pry off gear (2).



9. INSPECT BALL BEARING (3).
    a. Turn gear (2) over.
    b. Inspect ball bearing (3) for damage. See TM 9-214.
    c. If bearing (3) is damaged, go to step 10. If not, go to step 12.



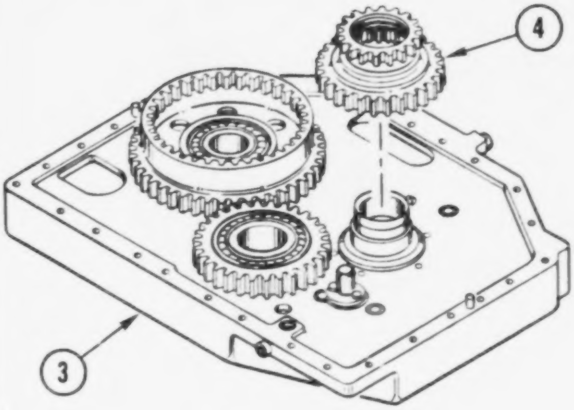
10. REMOVE AND DISCARD BALL BEARING (3).
    a. Using screwdriver, remove retaining ring (4).
    b. Using drive punch, tap out and discard bearing (3).



11. CHECK GEAR (1).

    a. Using indicator caliper, measure inside diameter of outer rim (2).

    b. Replace gear (1) if measurement is greater than 5.5114 inches (139.990 mm).

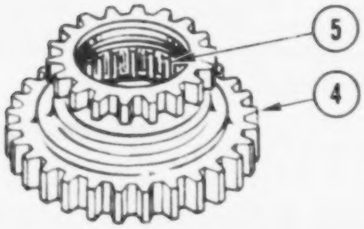


12. REPAIRER AND HELPER, TURN LEFT-HAND INTERMEDIATE HOUSING (3) OVER.

13. REMOVE SPUR GEAR CLUSTER (4).

    a. If cluster (4) is on housing (3), lift it off.

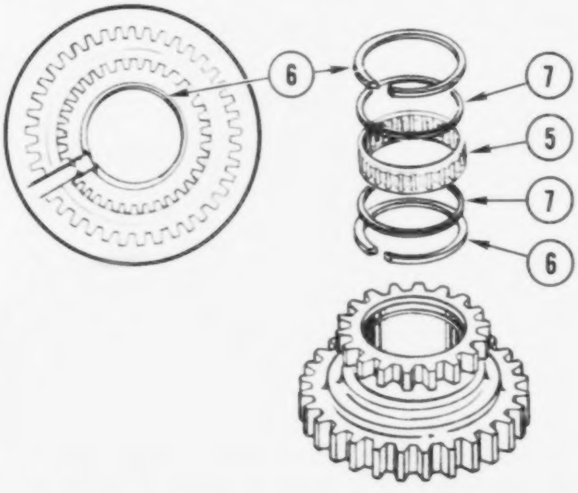
    b. If cluster (4) was removed, locate it.



14. INSPECT ROLLER BEARING (5).

    a. Inspect bearing (5) in spur gear cluster (4) for damage. See TM 9-214.

    b. If bearing (5) is damaged, go to step 15. If not, go to step 17.



15. REMOVE AND DISCARD BEARING (5).

    a. Using screwdriver, remove retaining ring (6), thrust washer bearing (7), and bearing (5). Discard bearing.

    b. Remove second thrust washer bearing (7) and second retaining ring (6).

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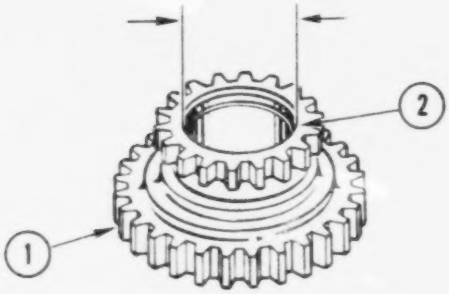
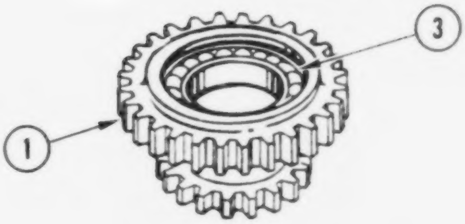


16. CHECK GEAR CLUSTER (1).

   a. Using telescoping gage set and micrometer caliper set, measure diameter of hole (2).

   b. Replace gear cluster (1) if measurement is greater than 3.3778 inches (85.796 mm). Go to step 21. If not, go to step 17.

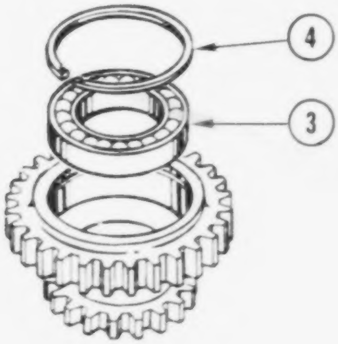


17. TURN GEAR CLUSTER (1) OVER.

18. INSPECT BALL BEARING (3).

   a. Inspect bearing (3) for damage. See TM 9-214.

   b. If bearing (3) is damaged, go to step 19. If not, go to step 21.



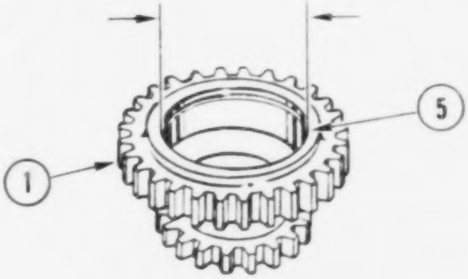
NOTE

Some gear clusters may have access holes. If access holes are present, bearing may be removed using drive punch from opposite side of gear cluster.

19. REMOVE AND DISCARD BEARING (3).

   a. Using retaining-ring pliers (Item 61), remove retaining ring (4).

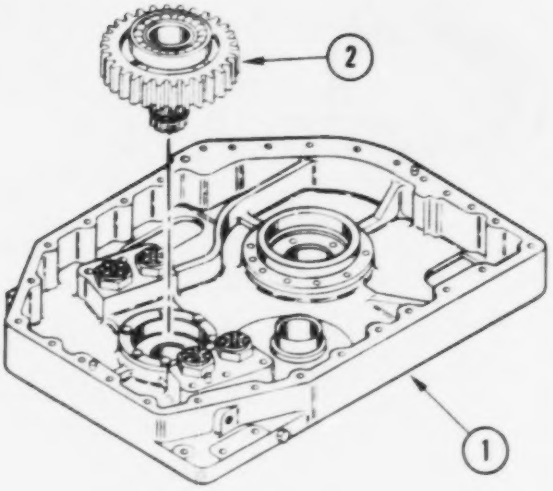
   b. Using drive punch, tap out and discard bearing (3).



20. CHECK GEAR CLUSTER (1).

   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of hole (5).

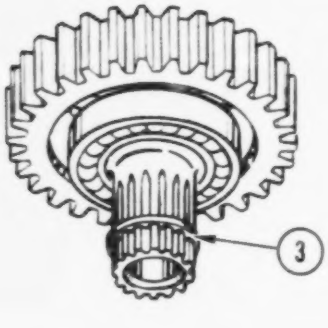
   b. Replace gear cluster (1) if measurement is greater than 5.1177 inches (130.000 mm).



21. REPAIRER AND HELPER TURN HOUSING (1) OVER.

22. REMOVE SPUR GEARSHAFT (2).

    a. Using pry bar, pry out gearshaft (2).

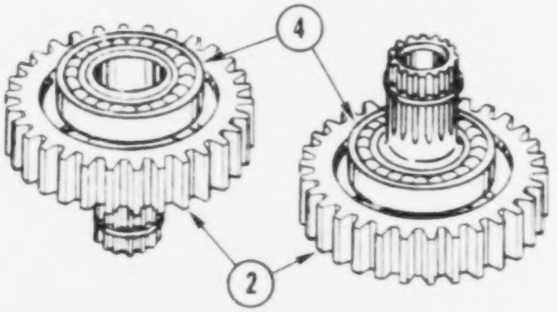


23. INSPECT RETAINING RING (3).

    a. Inspect retaining ring (3) for damage. See page 2-5.

    b. If retaining ring (3) is damaged, go to step 24. If not, go to step 25.

24. USING RETAINING-RING PLIERS, REMOVE AND DISCARD RETAINING RING (3).



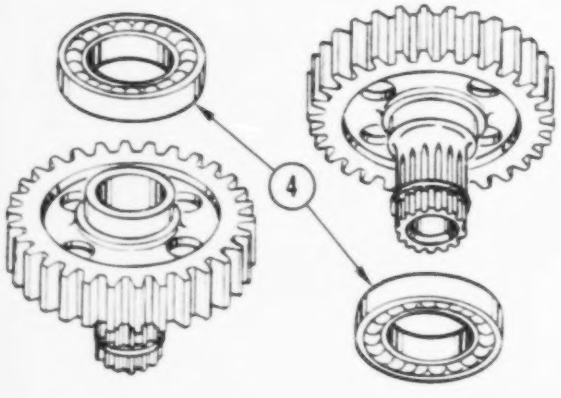
NOTE

Ball bearings might not come out with spur gearshaft. One bearing may stay in intermediate housing, the other bearing may stay in single disk brake.

25. INSPECT TWO BALL BEARINGS (4).

    a. Inspect bearings (4) on each end of gearshaft (2) for damage. See TM 9-214.

    b. If either bearing (4) is damaged, go to step 26. If not, go to step 28.



26. REMOVE DAMAGED BEARING(S) (4).

    a. Using mechanical puller kit, remove damaged bearing(s) (4). Discard bearings.

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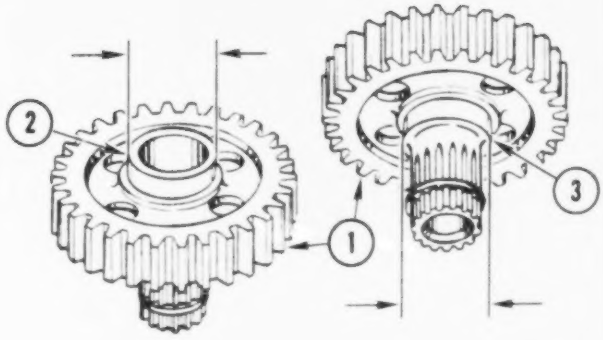
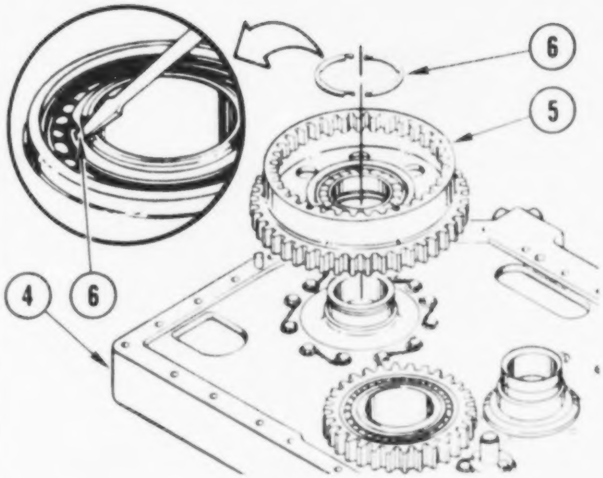


27. CHECK GEARSHAFT (1).

    a. Using micrometer caliper set, measure outside diameters (2), and (3).

    b. Replace gearshaft (1) if either measurement is less than 2.9524 inches, (74.991 mm).

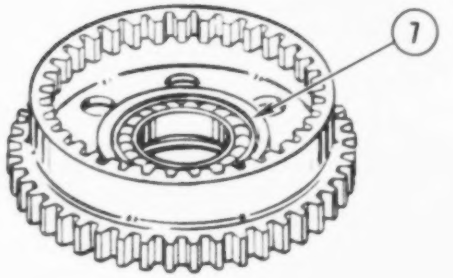


28. REPAIRER AND HELPER, TURN HOUSING (4) OVER.

29. REMOVE SPUR GEAR (5).

    a. Using screwdriver, remove interlocking retaining ring (6).

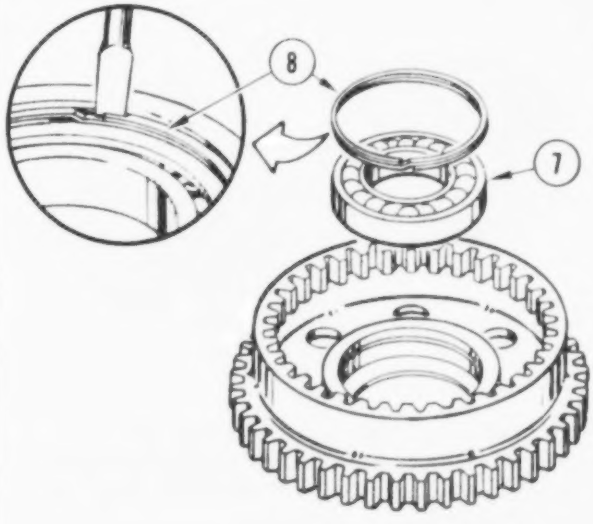
    b. Using pry bar, remove gear (5).



30. INSPECT BALL BEARING (7).

    a. Inspect bearing (7) for damage. See TM 9-214.

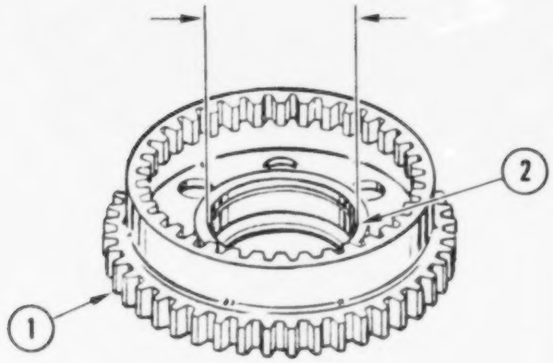
    b. If bearing (7) is damaged, go to step 31. If not, go to step 33.



31. REMOVE BEARING (7).

    a. Using screwdriver, remove retaining ring (8).

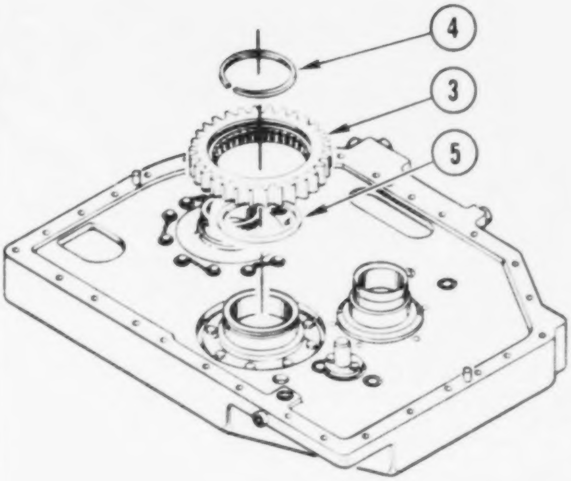
    b. Using hammer and punch, remove and discard bearing (7).



32. CHECK SPUR GEAR (1).

a. Using telescoping gage set and micrometer caliper set, measure inside diameter (2).

b. Replace gear (1) if measurement is greater than 5.1177 inches (130.000 mm).

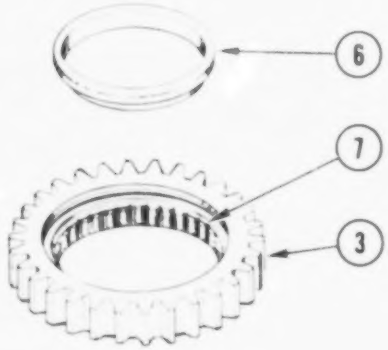


33. REMOVE SPUR GEAR (3).

a. Using retaining-ring pliers (Item 59), remove retaining ring (4).

b. Remove gear (3).

c. Remove end plate (5).

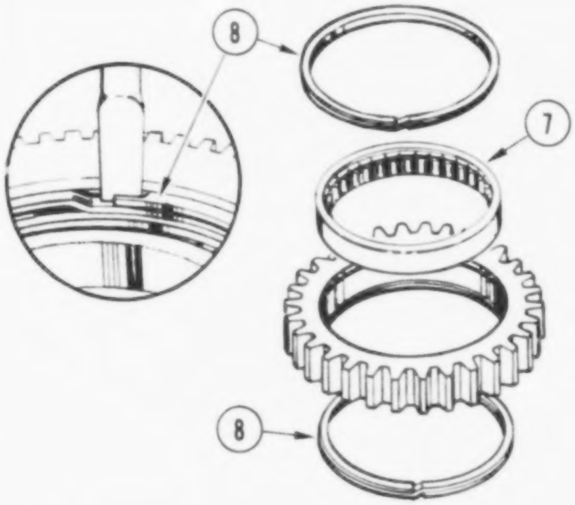


34. REMOVE SHAFT SHOULDER (6) FROM SPUR GEAR (3).

a. Remove shaft shoulder (6) from spur gear (3).

b. Inspect bearing (7) for damage. See TM 9-214.

c. If bearing (7) is damaged, go to step 35. If not, go to step 37.



35. REMOVE BEARING (7).

a. Using screwdriver, remove two retaining rings (8).

b. Using arbor press and bearing installer (Item 8), press out and discard bearing (7).

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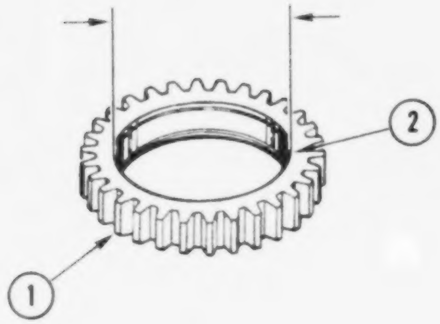
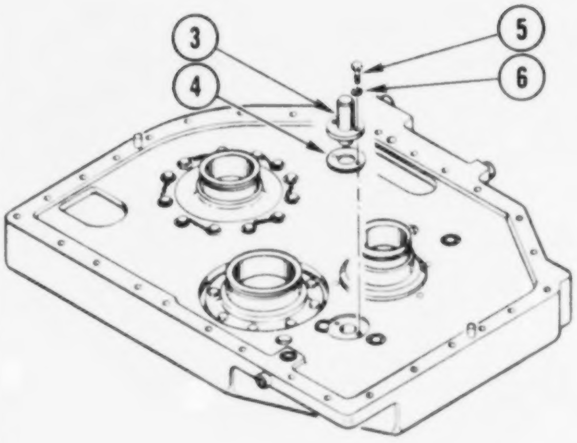


36. CHECK GEAR (1).

   a. Using telescoping gage set and micrometer caliper set, measure inside diameter (2).

   b. Replace gear (1) if measurement is greater than 5.9051 inches (150.000 mm).

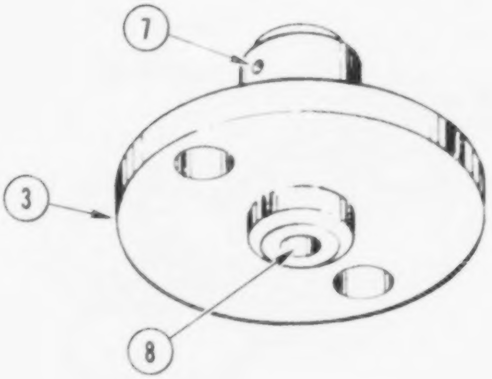


37. REMOVE OIL LUBE BLOCK (3) AND GASKET (4).

   a. Remove two screws (5) and washers (6).

   b. Remove lube block (3).

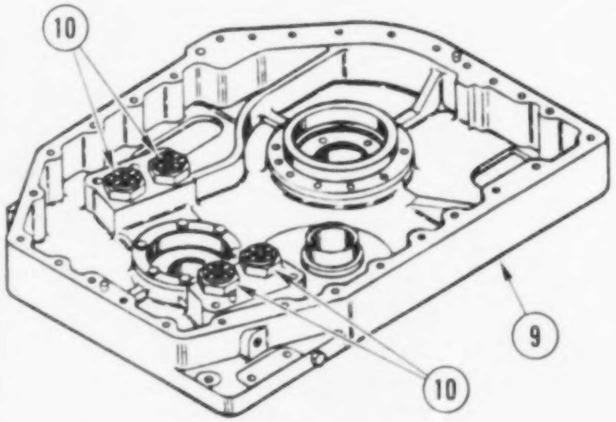
   c. Remove and discard gasket (4).



38. INSPECT LUBE BLOCK (3).

   a. Inspect lube block bores (7) and (8) for chips and dirt.

   b. If bores (7) or (8) are plugged, clean them. See page 2-2.

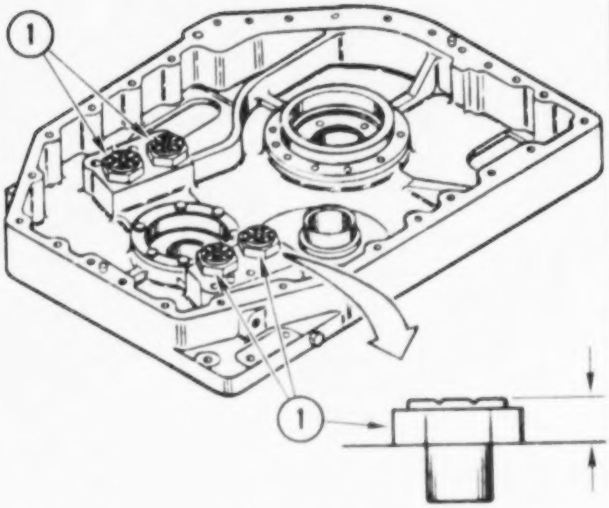


39. REPAIRER AND HELPER TURN HOUSING (9) OVER.

40. INSPECT FOUR BRAKE PADS (10).

   a. Inspect four pads (10) for damage. See page 2-5.

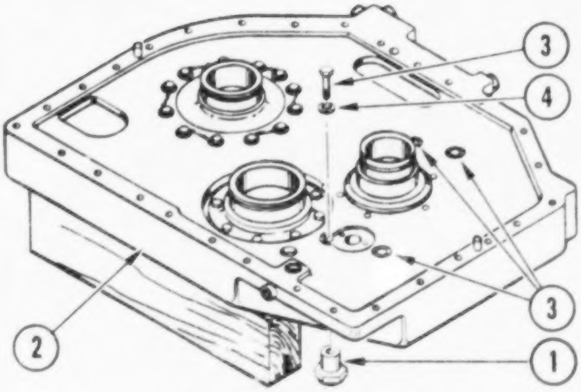
   b. If pads (10) are not damaged, go to step 41. If any pad is damaged, go to step 42.



41. CHECK FOUR PADS (1).

a. Using depth gage measure height of four pads (1).

b. If any pad measures less than 0.644 inch (16.36 mm), go to step 42. If each pad (1) measures 0.644 inch (16.36 mm) or more, go to step 44.



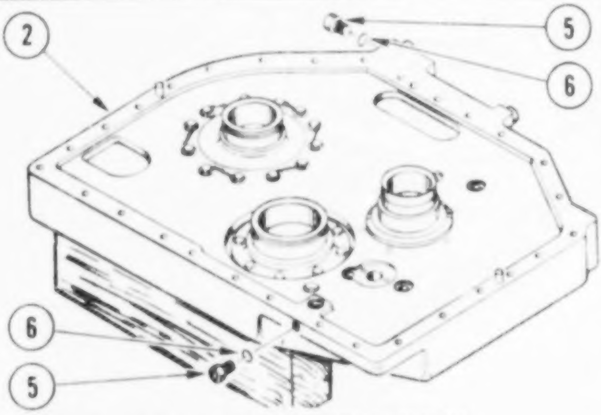
42. REPAIRER AND HELPER TURN HOUSING (2) OVER AND PLACE ON TWO WOOD BLOCKS.

43. REMOVE FOUR PADS (1).

a. (H) Using 1-inch ratchet handle and 1 3/4-inch socket, hold pads (1). Repairer, remove four screws (3), and washers (4).

b. Remove four pads (1) from underside of housing (2). Discard four pads.

c. Go to step 45.

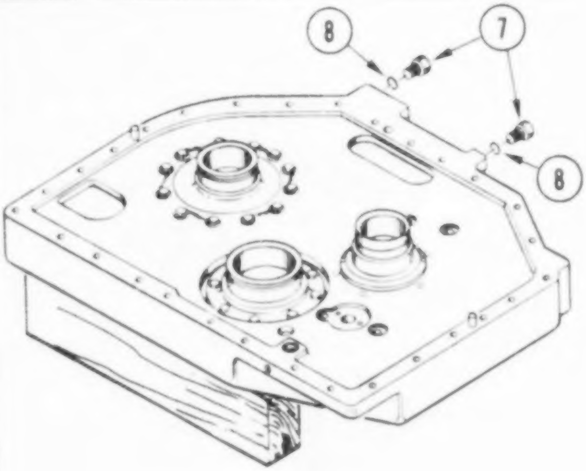


44. REPAIRER AND HELPER, TURN HOUSING (2) OVER AND PLACE ON TWO WOOD BLOCKS.

45. REMOVE TWO MACHINE THREAD PLUGS (5).

a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove two plugs (5).

b. Remove and discard two preformed packings (6).

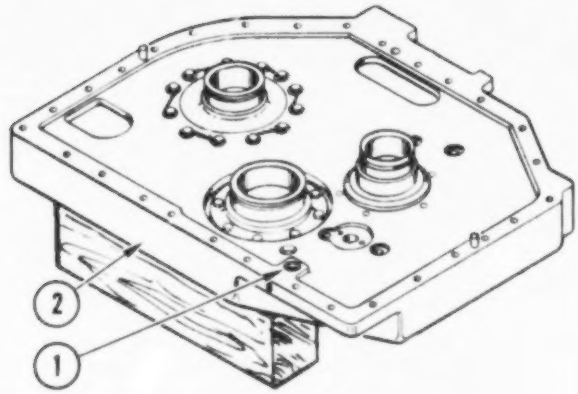


46. REMOVE TWO MACHINE THREAD PLUGS (7).

a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove two plugs (7).

b. Remove and discard two preformed packings (8).

GO TO NEXT PAGE

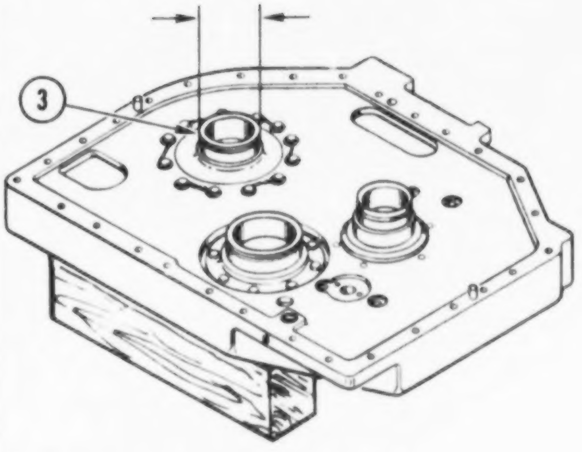


47. INSPECT WIRE FABRIC (1).

   a. Inspect fabric (1) for dirt. If fabric is plugged, clean it. See page 2-2.

   b. Inspect fabric (1) for loose or bent wires.

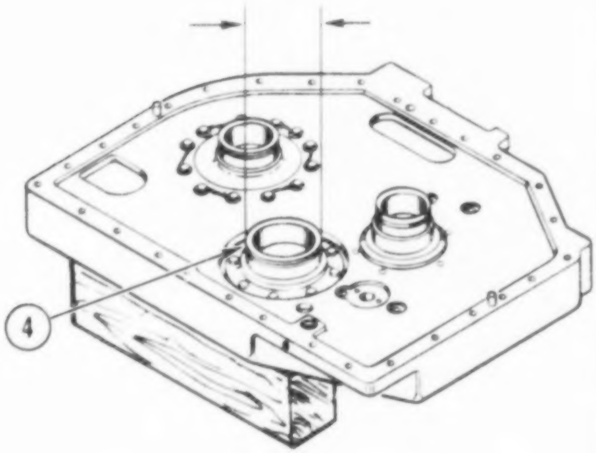
   c. If fabric (1) is damaged, housing (2) must be replaced. Go to step 55. If fabric is not damaged, go to step 48.



48. CHECK OUTPUT BEARING SUPPORT (3).

   a. Using micrometer caliper set, measure outside diameter of bearing support (3).

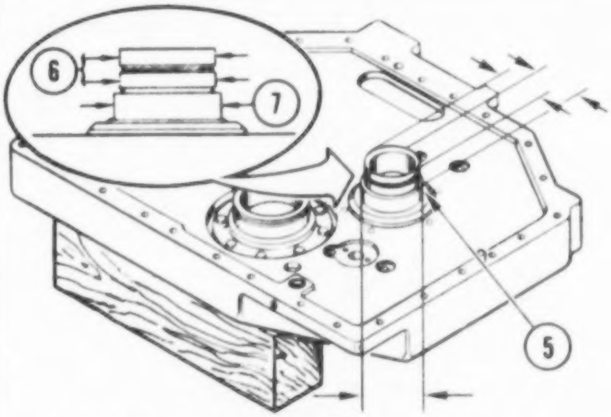
   b. If measurement is less than 3.3443 inches (84.945 mm), go to step 55. If not, go to step 49.



49. CHECK MECHANICAL HOUSING (4).

   a. Using micrometer caliper set, measure outside diameter of mechanical housing (4).

   b. If measurement is less than 4.3288 inches (109.952 mm), go to step 55. If not, go to step 50.

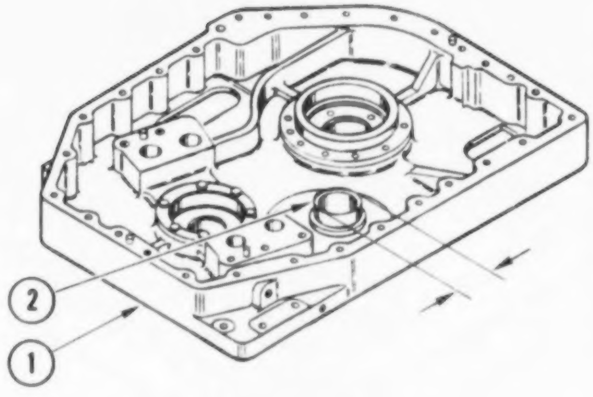


50. CHECK MECHANICAL HOUSING (5).

   a. Using micrometer caliper set, measure two outside diameters (6) and one outside diameter (7) on mechanical housing (5).

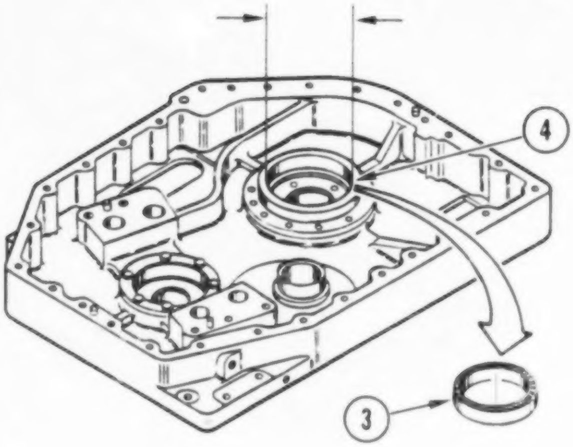
   b. If either measurement (6) is less than 2.9990 inches (76.175 mm), go to step 55. If not, go to step 50c.

   c. If measurement (7) is less than 3.3445 inches (84.950 mm), go to step 55. If not, go to step 51.

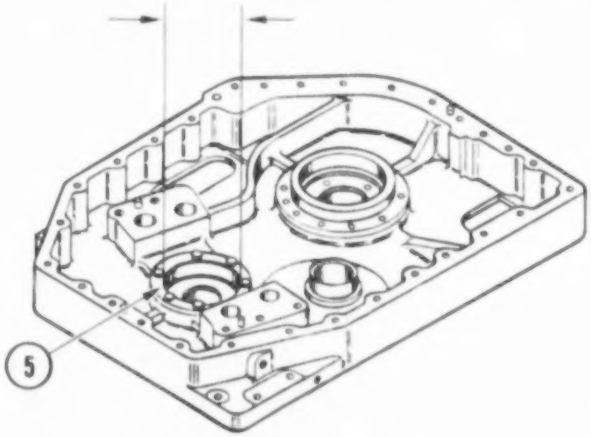


51. REPAIRER AND HELPER, TURN HOUSING (1) OVER.

52. CHECK MECHANICAL HOUSING (2).
    a. Using micrometer caliper set, measure outside diameter of mechanical housing (2).
    b. If measurement is less than 3.1478 inches (79.954 mm), go to step 55. If not, go to step 53.



53. IF BEARING (3) WAS REMOVED, CHECK BORE (4).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bore (4).
    b. If measurement is greater than 5.9070 inches (150.038 mm), go to step 55. If not, go to step 54.



54. CHECK BEARING BORE (5).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bore (5).
    b. If measurement is greater than 4.5290 inches (115.037 mm), go to step 55. If not, go to step 56.

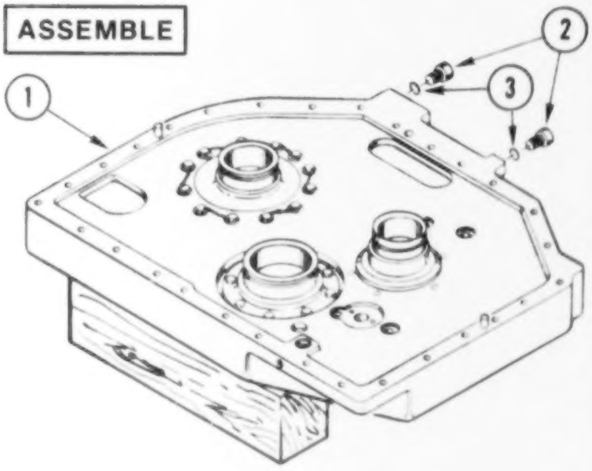
55. REPLACE LEFT-HAND INTERMEDIATE HOUSING. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING TO DEPOT. GO TO STEP 58.

56. CLEAN LEFT-HAND INTERMEDIATE HOUSING.
    a. Clean housing and piece parts. See page 2-2.

57. INSPECT LEFT-HAND INTERMEDIATE HOUSING.
    a. Inspect housing, piece parts and inserts. See page 2-5.
    b. Repair inserts if damaged. See task REPAIR LEFT-HAND INTERMEDIATE MECHANICAL HOUSING INSERTS, page 4-253.

GO TO NEXT PAGE

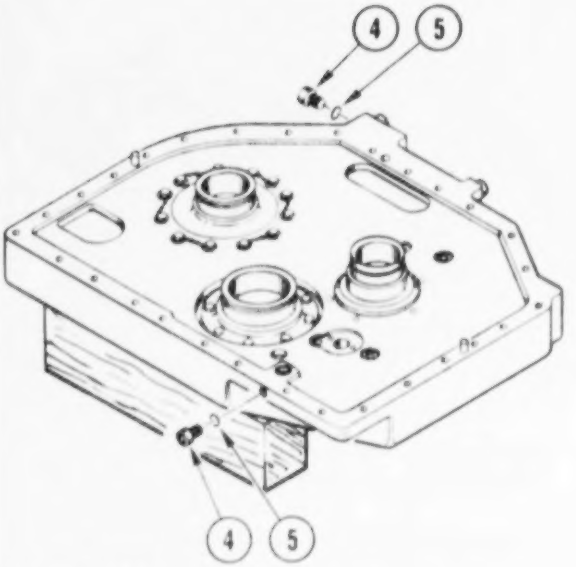
ASSEMBLE



58. REPAIRER AND HELPER TURN HOUSING (1) OVER AND PLACE ON TWO WOOD BLOCKS.

59. INSTALL TWO PLUGS (2).
    a. Coat two new preformed packings (3) with transmission oil. Install packings on two plugs (2).
    b. Install two plugs (2).

60. USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (2) TO 75-85 in-lb (86-98 cmkg).

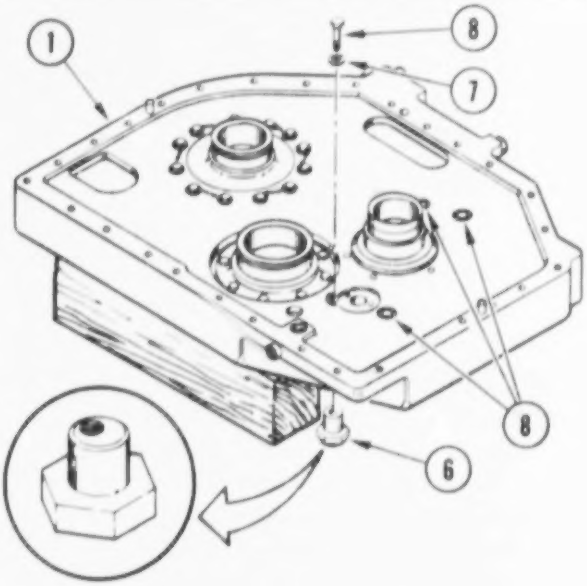


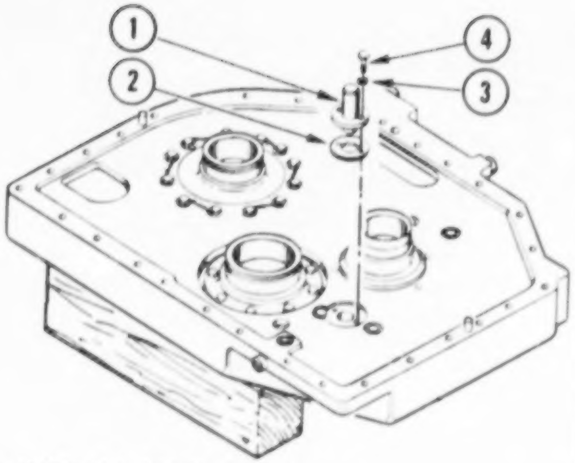
61. INSTALL TWO PLUGS (4).
    a. Coat two new preformed packings (5) with transmission oil. Install packings on two plugs (4).
    b. Install two plugs (4).

62. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (4) TO 110-120 in-lb (127-138 cmkg).

63. INSTALL FOUR NEW PADS (6).
    a. If pads (6) were discarded, replace with new pads. If pads were not discarded, go to step 65.
    b. Position four pads (6) from underside of housing (1). Rotate pads until hole in pad alines with screw hole in housing.
    c. (H) Using 1-inch ratchet handle and 1 3/4-inch socket, hold pads (6). Install four washers (7) and screws (8).

64. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE FOUR SCREWS (8) TO 40-45 ft-lb (6 mkg).



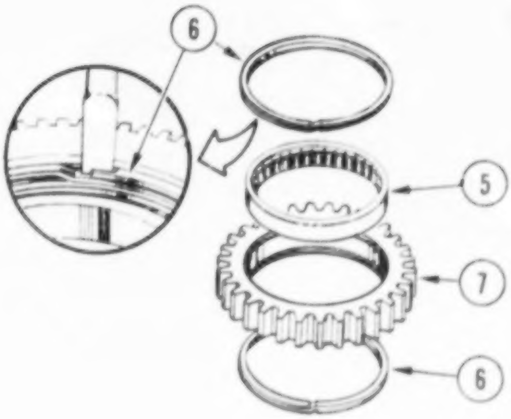


65. INSTALL LUBE BLOCK (1).

a. Position new gasket (2) and lube block (1).

b. Install two washers (3) and screws (4).

66. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (4) TO 10-12 ft-lb (1-2 mkg).

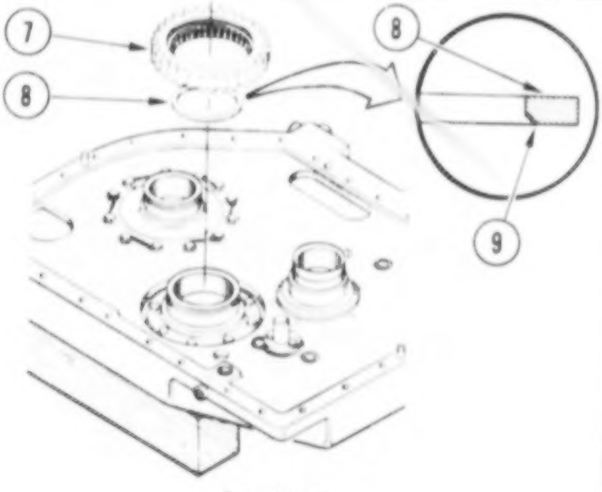


67. INSTALL ROLLER BEARING (5).

a. Using screwdriver, install retaining ring (6) in gear (7).

b. Using arbor press and bearing installer (Item 8), press bearing (5) against ring (6).

c. Using screwdriver, install second retaining ring (6).



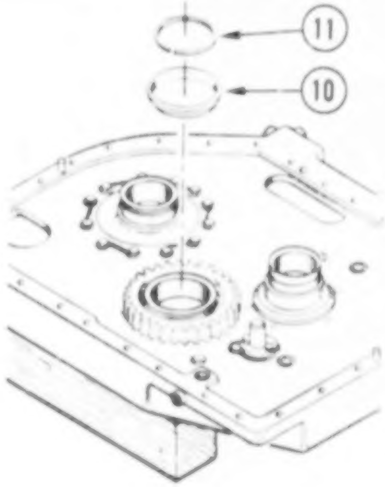
CAUTION

Beveled side of end plate must be installed toward housing. End plate must be installed by hand. Damage to equipment can occur.

68. INSTALL GEAR (7).

a. Install end plate (8) with beveled side (9) toward housing.

b. Install gear (7).



CAUTION

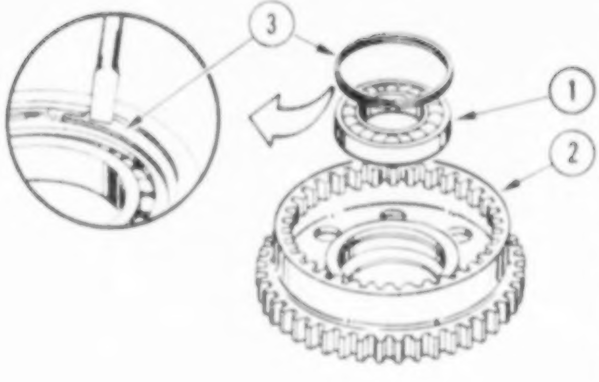
Shaft shoulder must be installed by hand. Damage to equipment can occur.

69. INSTALL SHAFT SHOULDER (10).

a. Install shaft shoulder (10).

b. Using retaining-ring pliers (Item 59), install retaining ring (11).

GO TO NEXT PAGE

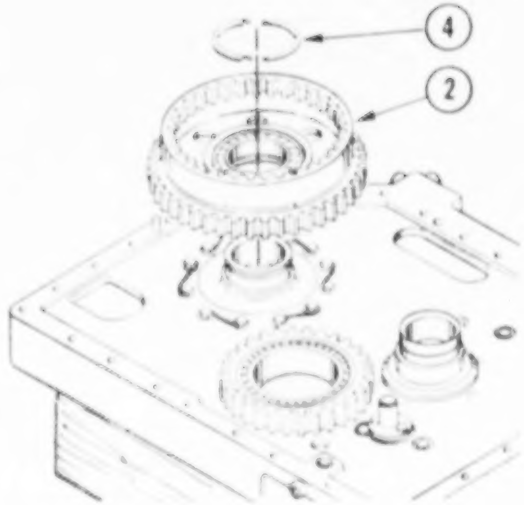


70. INSTALL NEW BEARING (1).

a. If bearing (1) was removed, go to step 70b. If not, go to step 71.

b. Using arbor press and bearing installer (Item 10), press bearing (1) into spur gear (2).

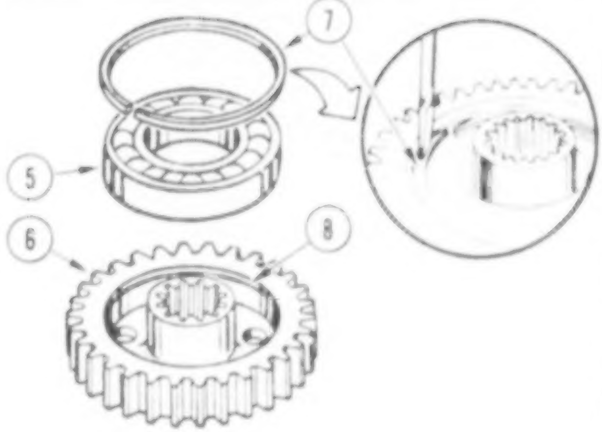
c. Using screwdriver, install retaining ring (3).



71. INSTALL SPUR GEAR (2).

a. Install gear (2).

b. Using slip-joint pliers, install interlocking retaining ring (4).

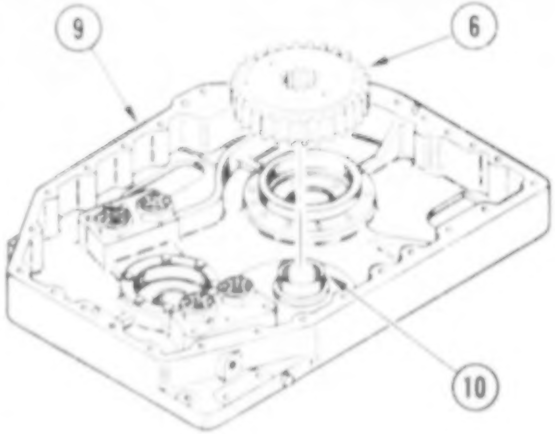


72. INSTALL NEW BEARING (5) IN GEAR (6).

a. If bearing (5) was removed, go to step 72b. If not, go to step 73.

b. Using arbor press and bearing installer (Item 6), press bearing (5) into gear (6).

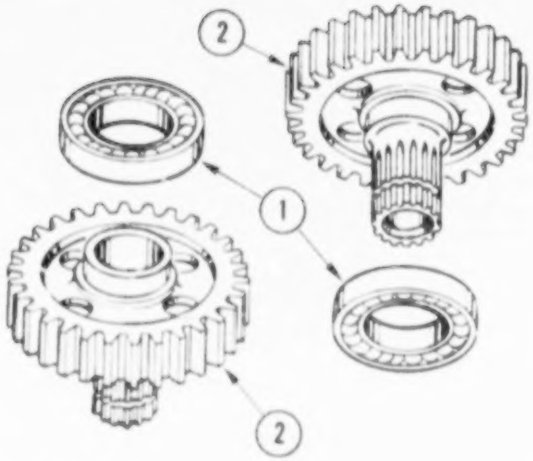
c. Using screwdriver, install retaining ring (7) in groove (8).



73. REPAIRER AND HELPER, TURN HOUSING (9) OVER.

74. INSTALL GEAR (6).

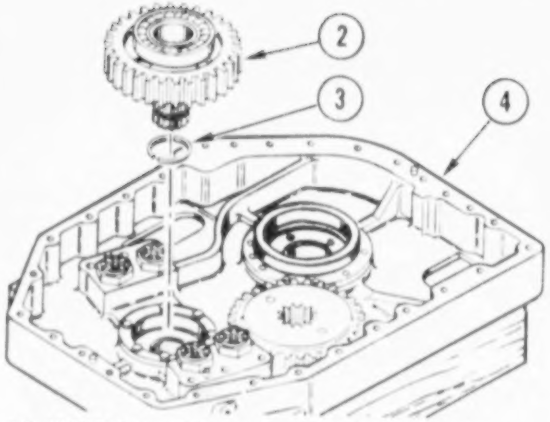
a. Using plastic-faced hammer, tap gear (6) onto mechanical housing (10).



75. INSTALL TWO NEW BEARINGS (1) ON GEARSHAFT (2).

a. If either bearing (1) was removed, go to step 75b. If not, go to step 76.

b. Using arbor press and bearing installer (Item 7), press either bearing(s) (1) onto gearshaft (2).



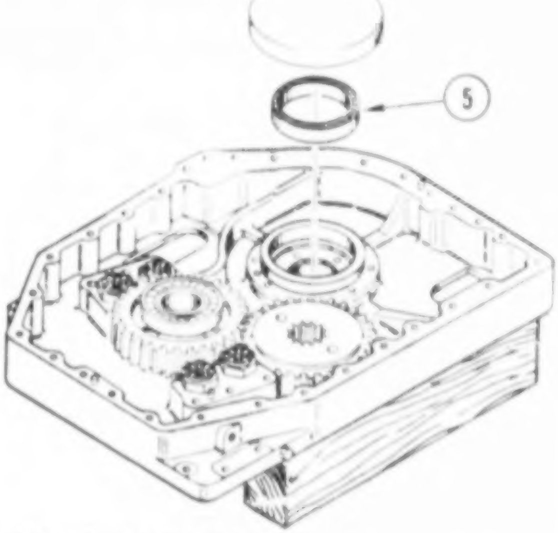
76. INSTALL RETAINING RING (3), IF REMOVED.

a. Using retaining-ring pliers (Item 59), install retaining ring (3) on gearshaft (2).

77. REPAIRER AND HELPER, PLACE HOUSING (4) ON TWO WOOD BLOCKS.

78. INSTALL GEARSHAFT (2).

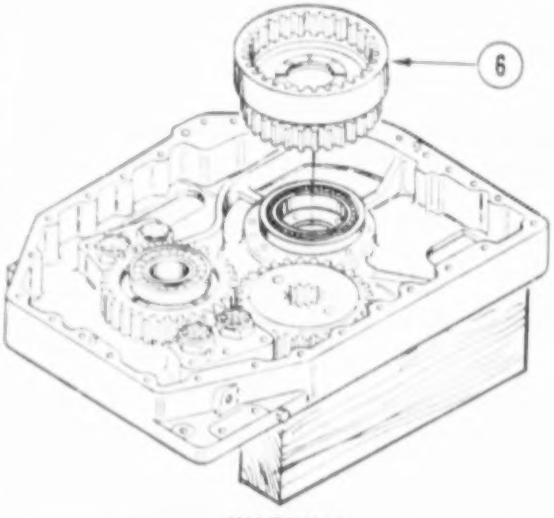
a. Using plastic-faced hammer, tap gearshaft (2) into housing (4).



79. INSTALL NEW BEARING (5).

a. If bearing (5) was removed, go to step 79b. If not, go to step 80.

b. Using plastic-faced hammer and bearing installer (Item 8), install bearing (5).

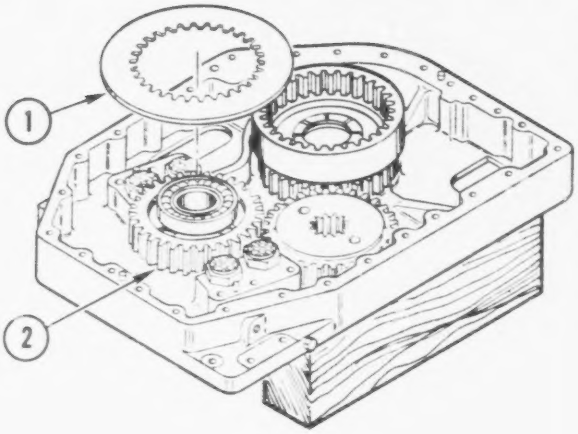


WARNING

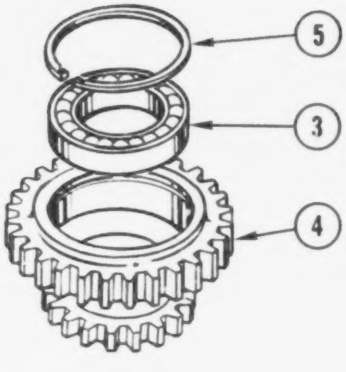
Do not turn housing over. Spur gear can fall off and personnel can be injured.

80. INSTALL GEAR (6).

GO TO NEXT PAGE



81. INSTALL CLUTCH DISK (1) ON GEAR (2).



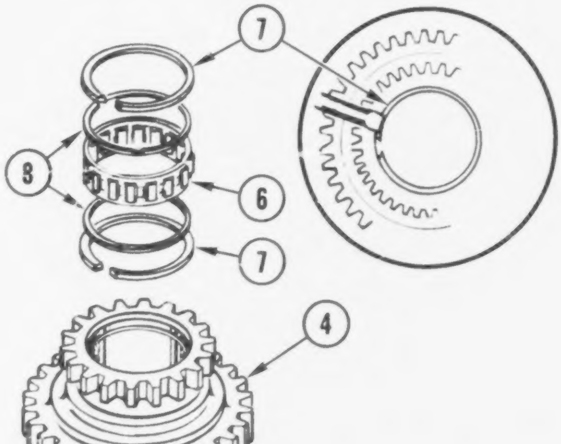
82. INSTALL NEW BEARING (3).
    - a. If bearing (3) was removed, go to step 82b. If not, go to step 83.
    - b. Using arbor press and bearing installer (Item 10), press bearing (3) into gear cluster (4).
    - c. Using retaining-ring pliers (Item 61), install retaining ring (5).

NOTE

This gear cluster is installed when intermediate housing is installed on transmission housing.

83. TURN GEAR CLUSTER (4) OVER.

84. INSTALL NEW BEARING (6).
    - a. If bearing (6) was removed, go to step 84b. If not,go to step 85.
    - b. Using screwdriver, install retaining ring (7) and thrust washer bearing (8).
    - c. Install bearing (6).
    - d. Using screwdriver, install second thrust washer bearing (8) and second retaining ring (7).



85. INSTALL LEFT-HAND SINGLE DISK BRAKE. See task REPLACE LEFT-HAND SINGLE DISK BRAKE, page 4-255.

END OF TASK

REPAIR LEFT-HAND INTERMEDIATE MECHANICAL HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the left-hand intermediate mechanical housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inside/outside indicator caliper — (Item 41, App C)
Portable electric drill — (Item 58, App C)
Screw threading set — (Item 65, App C)
Socket wrench set — (Item 88, App C)
Socket wrench set — (Item 89, App C)
Transmission insert repair kit — (Item 103, App C)
Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)

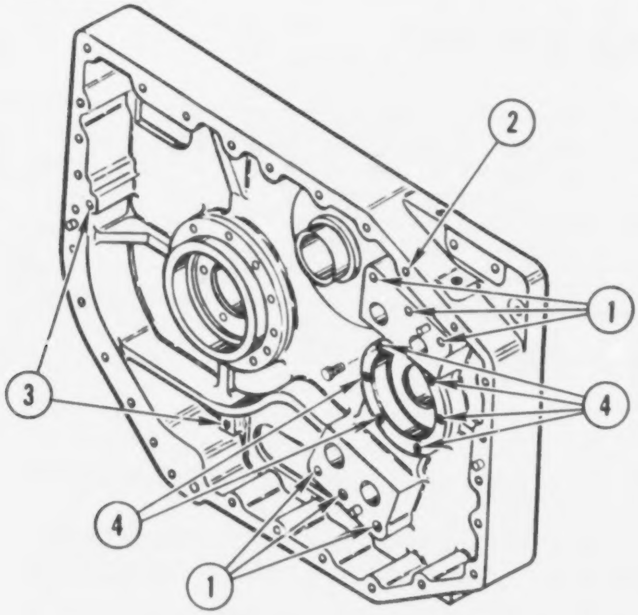
Personnel Required:

Track Veh Rep 63H10

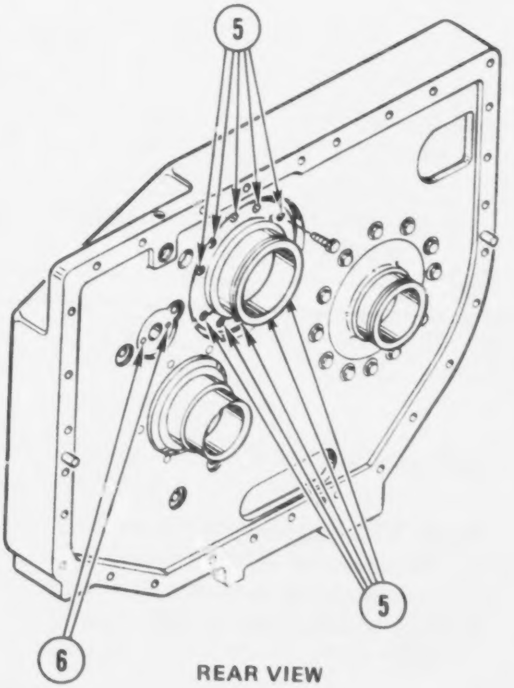
Equipment Conditions:

Left-hand intermediate mechanical housing on workbench. See page 4-236.

REPAIR



FRONT VIEW



REAR VIEW

GO TO NEXT PAGE

STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counterbore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-37L SR628L	SR62R		SR62T	RZA12788-7 RZA12656-7	.181-.191 in. (4.60-4.85 mm)	SR62WA	.045-.055 in. (1.14-1.40 mm)
	TO BE CHANGED AT DEPOT (NO OVERSIZE AVAILABLE)							
2	M45932/1-28 SR434	SR43R		SR43T	RZA12788-5 RZA12656-5	.138-.148 in. (3.51-3.76 mm)	SR43W4A	.045-.055 in. (1.14-1.40 mm)
	M45932/3-28 SRW434	SRW43R	SRW43D	SRW43T	RZA12789-5 RZA12791-5	.138-.148 in. (3.51-3.76 mm)	SR43W4A	.045-.055 in. (1.14-1.40 mm)
3	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
4	TO BE CHANGED AT DEPOT							
5	TO BE CHANGED AT DEPOT							
6	M45932/1-13L SR258L	SR25R		SR25T	RZA12788-2 RZA12656-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
	M45932/3-13L SRW258L	SRW25R	SRW25D	SRW25T	RZA12789-2 RZA12791-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)

END OF TASK

REPLACE LEFT-HAND SINGLE DISK BRAKE

DESCRIPTION

This task covers: Remove (page 4-255). Install (page 4-259).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Micrometer depth gage — (Item 54, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Sealant compound — (Item 11, App B)

Materials/Parts: (cont)

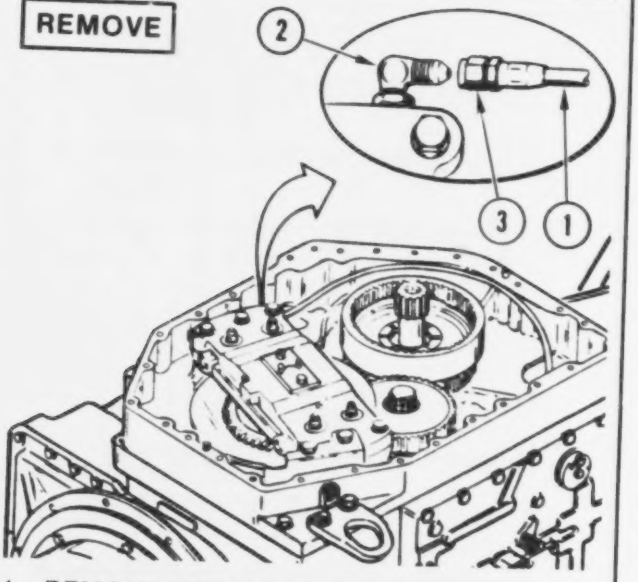
Transmission oil — (Item 12, App B)
Preformed packing (2)
Preformed packing
Self-locking bolt (6)

Personnel Required:

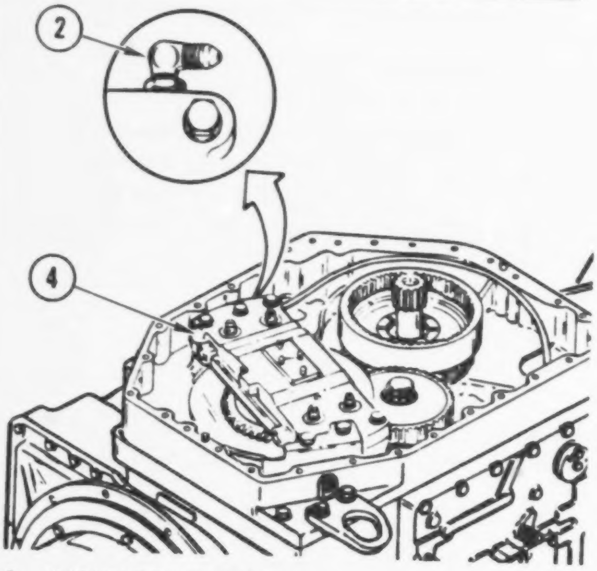
Track Veh Rep 63H10

Equipment Conditions:
Transmission mounted on tip-over stand. See page 2-144.

REMOVE



1. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
2. DISCONNECT HOSE ASSEMBLY (1) FROM HOSE TO BOSS ELBOW (2).
   a. Unscrew fitting (3) on hose assembly (1).



3. INSPECT ELBOW (2).
   a. Inspect elbow (2) for damage. See page 2-5.
   b. If elbow (2) is damaged or if single disk brake (4) is to be replaced, go to step 4. If elbow is not damaged and brake is not to be replaced, go to step 5.

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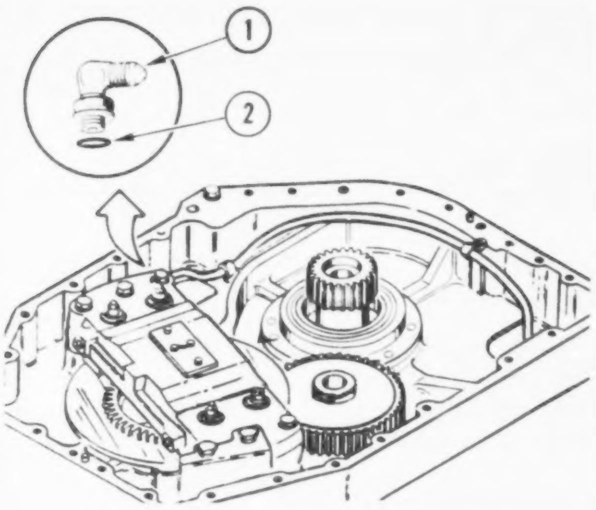
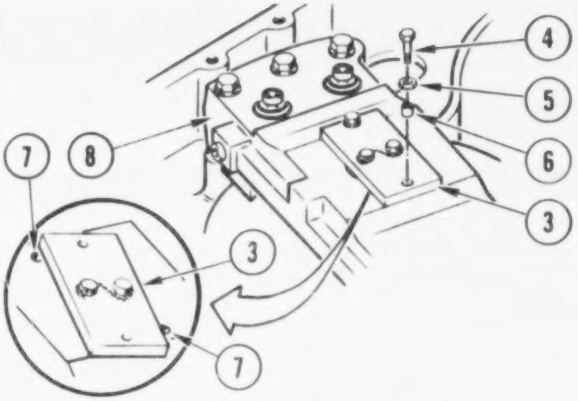


4. REMOVE ELBOW (1).

   a. Unscrew elbow (1).

   b. Remove and discard preformed packing (2).

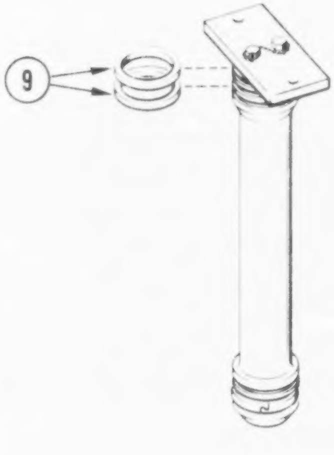


5. REMOVE SPINDLE ASSEMBLY (3) IF INSTALLED.

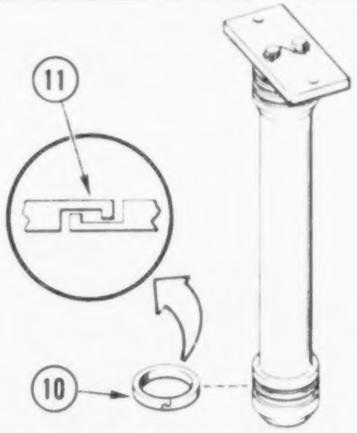
   a. Remove two screws (4), washers (5), and sleeve spacers (6).

   b. Rotate spindle assembly (3) until part of screw holes (7) show.

   c. Using screw holes (7) as pry points, carefully pry spindle assembly (3) out of brake (8).



6. REMOVE AND DISCARD TWO PREFORMED PACKINGS (9).



7. INSPECT METAL SEAL RING (10).

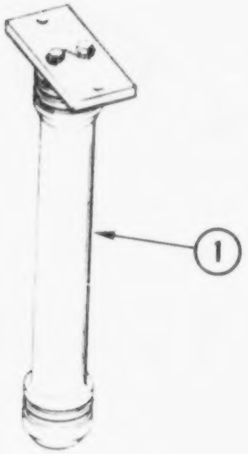
   a. Inspect ring (10) for damage. See page 2-5.

   b. If ring (10) is damaged, go to step 8. If not, go to step 9.

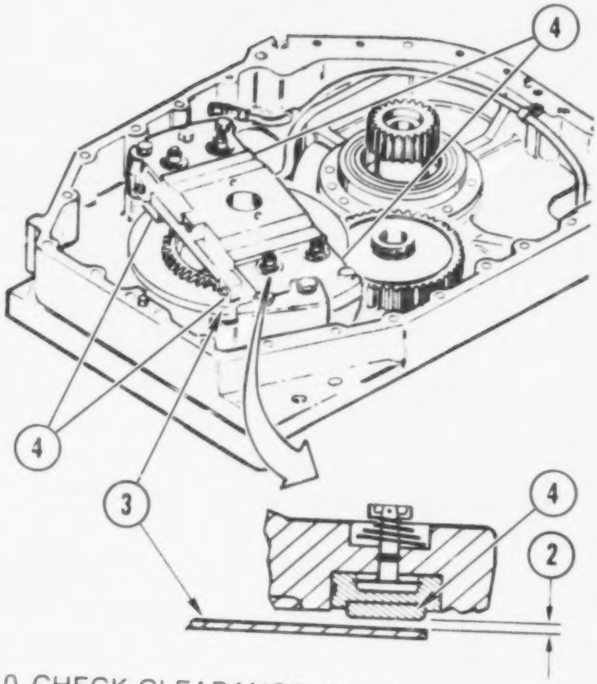
8. REMOVE RING (10).

   a. Squeeze ring (10) with fingers until hook (11) releases.

   b. Spread open and remove ring (10). Discard ring.



9. INSPECT SPINDLE ASSEMBLY (1).
    a. Inspect spindle assembly (1). See page 2-5.
    b. Replace spindle assembly (1) if damaged.

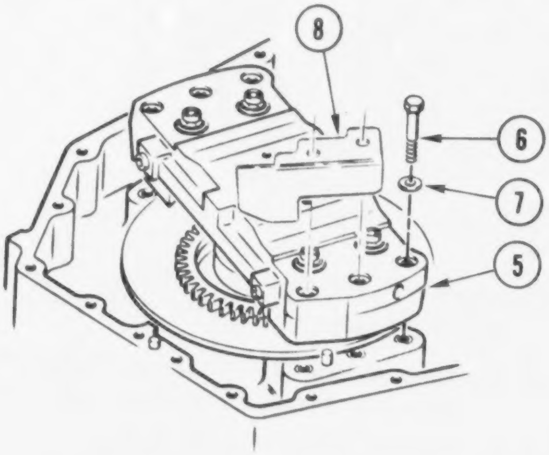


10. CHECK CLEARANCE (2) OF CLUTCH DISK (3).
    a. Measure clearance (2) between clutch disk (3) and four brake pads (4).
    b. If clearance (2) is 0.021-0.060 inch (0.53-1.52 mm), go to step 11. If not, go to step 14.

CAUTION

Do not pry against clutch disk. Damage to equipment can occur.

11. REMOVE BRAKE (5).
    a. Remove six self-locking bolts (6), washers (7), and oil baffle (8). Discard bolts.
    b. Using pry bar, pry off brake (5).
12. REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.
13. GO TO STEP 16.



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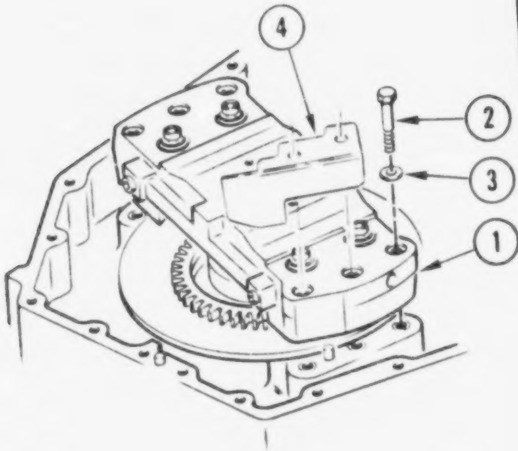
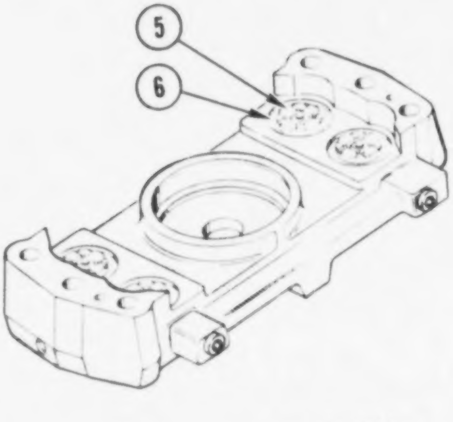


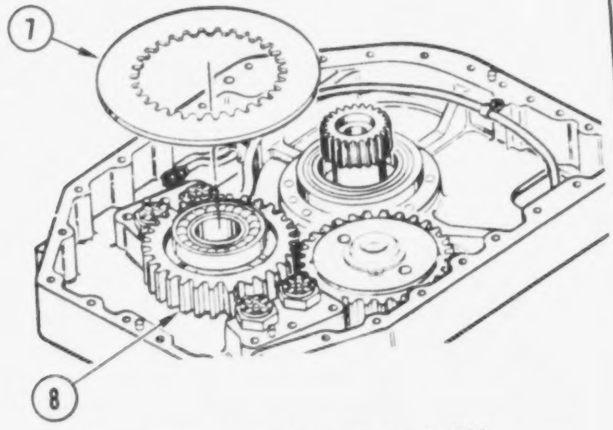
CAUTION

Do not pry against clutch disk. Damage to equipment can occur.

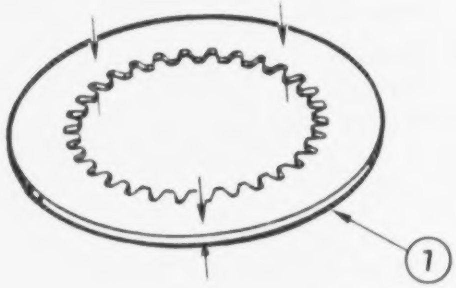
14. REMOVE BRAKE (1).
    a. Remove six self-locking bolts (2), washers (3), and oil baffle (4). Discard bolts.
    b. Using pry bar, pry off brake (1).



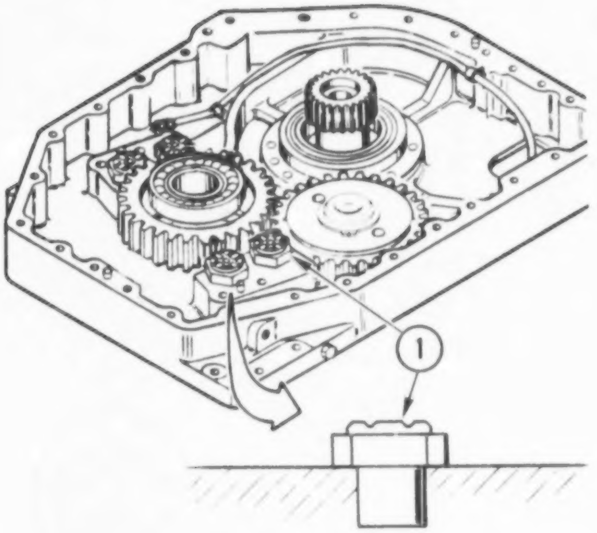
15. INSPECT FOUR PADS (5) ON PISTON ASSEMBLIES (6).
    a. Inspect four pads (5) for damage. See page 2-5.
    b. If pads (5) are not damaged, go to step 16. If any pad is damaged, replace all piston assemblies (6). See task REPAIR LEFT-HAND SINGLE DISK BRAKE, page 4-262.



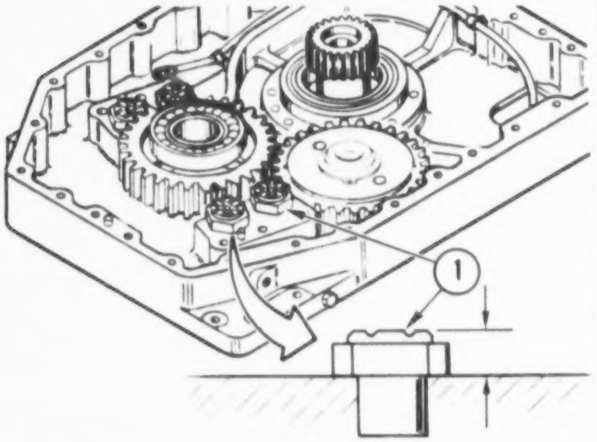
16. INSPECT CLUTCH DISK (7) ON SPUR GEARSHAFT (8).
    a. Remove disk (7) and inspect both sides for damage. See page 2-5.
    b. If disk (7) is damaged, replace it and go to step 17. If not, go to step 16.1.



16.1 CHECK DISK (7).
    a. Using micrometer caliper set, measure thickness of disk (7) in three places.
    b. Replace disk (7) if thickness is less than 0.150 inch (3.81 mm).
    c. Using flat surface and feeler gage, check disk (7) for warpage. Check inside and outside edges in three places.
    d. Replace disk (7) if warpage is greater than 0.010 inch (0 25 mm).



17. INSPECT FOUR BRAKE PADS (1).
    a. Inspect four brake pads (1) for damage. See page 2-5.
    b. If no pads (1) are damaged, go to step 18. If any pad is damaged, all pads must be replaced. Go to step 19.

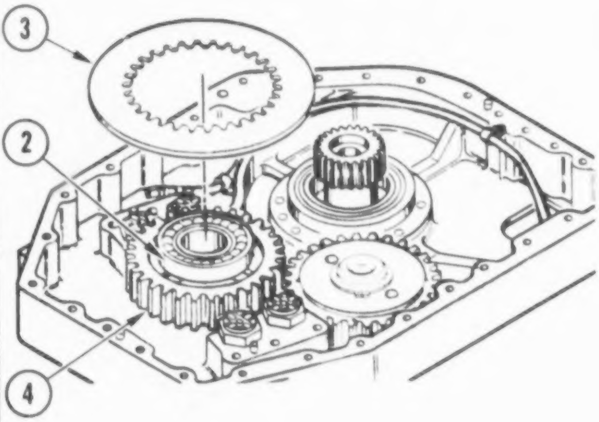


18. CHECK FOUR BRAKE PADS (1).
    a. Using depth gage, measure height of four brake pads (1).
    b. If all brake pads (1) measure 0.644 inch (16.36 mm) or more, go to step 22. If any pad measures less than 0.644 inch (16.36 mm), all pads must be replaced. Go to step 19.

19. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

20. REPAIR LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-236.

INSTALL



21. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY IF REMOVED. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

22. COAT OUTSIDE OF BALL BEARING (2) WITH TRANSMISSION OIL.

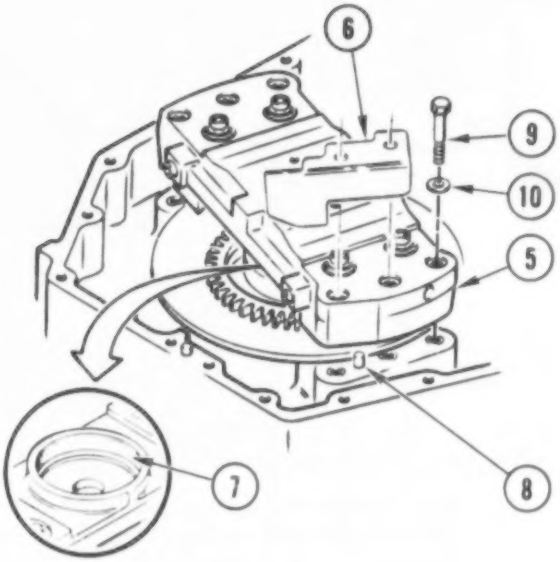
23. PLACE DISK (3) ON SPUR GEARSHAFT (4).

GO TO NEXT PAGE

CAUTION

Do not install self-locking bolts without sealing compound. Damage to equipment can occur.

24. INSTALL BRAKE (5) AND OIL BAFFLE (6).
    a. Coat inside of bearing bore (7) with transmission oil.
    b. Aline brake (5) with two pins (8). Install brake until fully seated.
    c. Aline oil baffle (6) over brake mounting holes.
    d. Coat threads of six new self-locking bolts (9) with sealant compound.
    e. Secure brake (5) and baffle (6) with six washers (10) and bolts (9).
25. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX BOLTS (9) TO 150-160 ft-lb (21-22 mkg).



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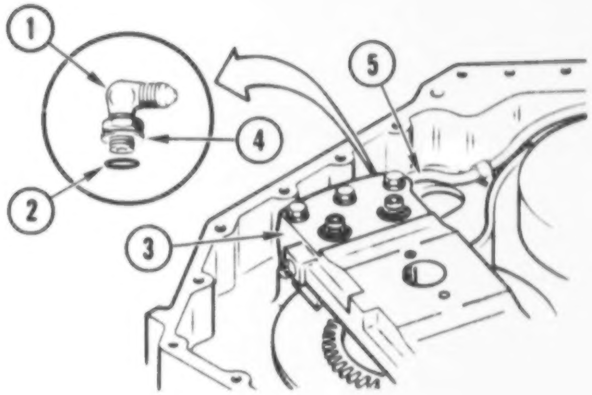
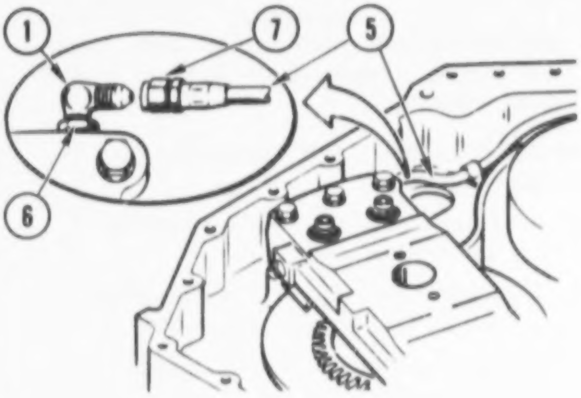


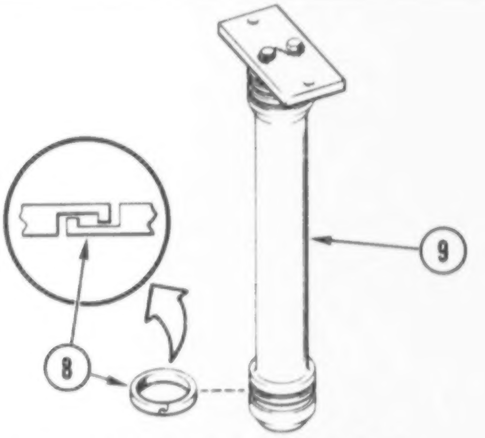
26. INSTALL ELBOW (1) IF REMOVED.
    a. Coat new preformed packing (2) with transmission oil and install packing on elbow (1).
    b. Screw elbow (1) into brake (3). Hand tighten until captive washer (4) makes firm contact with brake.
    c. Unscrew elbow (1) to position required to install hose assembly (5).



27. CONNECT HOSE ASSEMBLY (5) TO ELBOW (1).

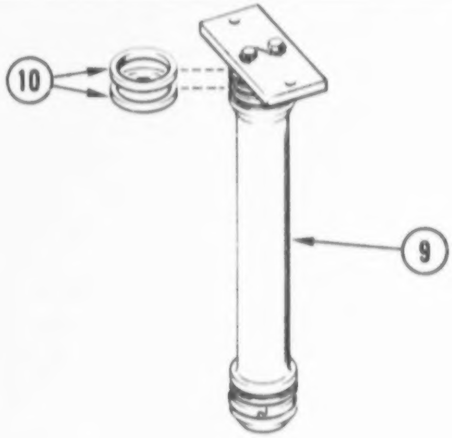
28. HOLD ELBOW (1). USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (6) TO 125-135 in-lb (144-155 cmkg).

29. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE FITTING (7) TO 125-135 in-lb (144-155 cmkg).



30. IF RING (8) WAS REMOVED, GO TO STEP 31. IF NOT, GO TO STEP 32.

31. INSTALL NEW RING (8).
    a. Coat new ring (8) with petrolatum.
    b. Install ring (8) on spindle assembly (9).
    c. Hook ring (8) by squeezing together with fingers.



32. INSTALL TWO NEW PREFORMED PACKINGS (10).
    a. Coat two new preformed packings (10) with transmission oil.
    b. Install two new packings (10) on spindle assembly (9).

NOTE

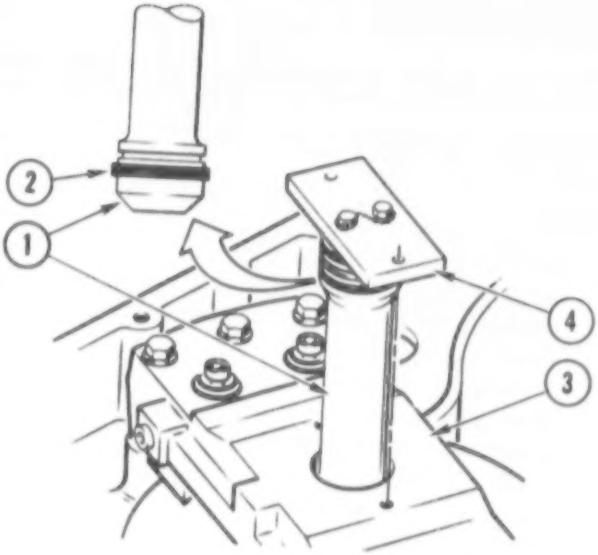
Remaining steps will install hardware that will prevent completion of an inspection tree.

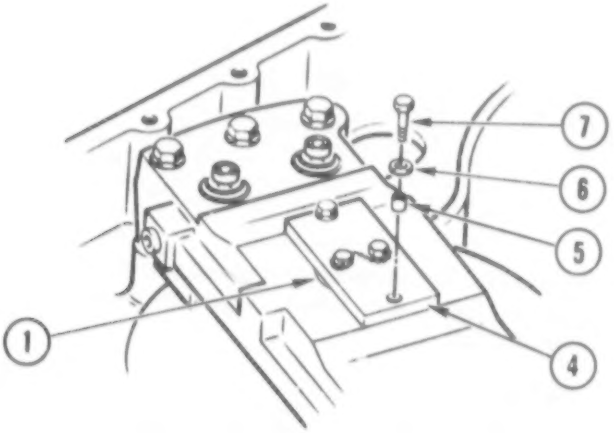
33. IF YOU ARE RETURNING TO AN INSPECTION TREE, GO TO END OF TASK. IF NOT, GO TO STEP 34.

CAUTION

Do not force spindle assembly into brake assembly. Metal seal ring can be damaged.

34. INSTALL SPINDLE ASSEMBLY (1).
    a. Coat ring (2) with petrolatum.
    b. Center ring (2) on spindle assembly (1).
    c. Insert spindle assembly (1) into brake (3).
    d. Aline screw holes in spindle plate (4) with screw holes in brake (3).





35. SECURE SPINDLE ASSEMBLY (1).
    a. Install two spacers (5) in two holes in spindle plate (4).
    b. Install two washers (6) and screws (7) and tighten evenly.

36. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (7) TO 10-12 ft-lb (1-2 mkg).

37. INSTALL LEFT-HAND CUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

END OF TASK

REPAIR LEFT-HAND SINGLE DISK BRAKE

DESCRIPTION

This task covers: Disassemble (page 4-262). Assemble (page 4-265).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Micrometer caliper set — (Item 52, App C)
Socket wrench attachment — (Item 79, App C)
Socket wrench attachment — (Item 81, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench (Item 99, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Disk brake parts kit

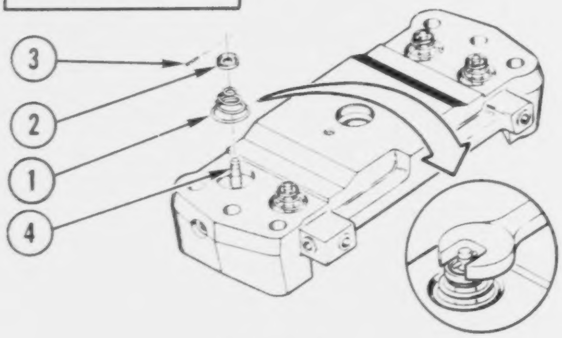
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Left-hand single disk brake on workbench. See page 4-255.

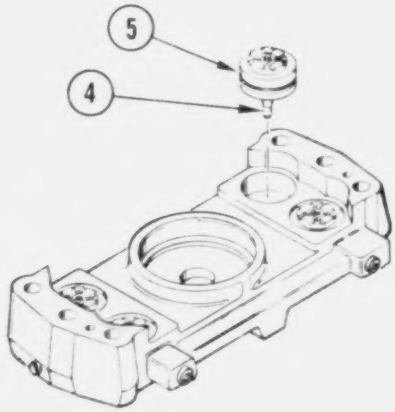
DISASSEMBLE



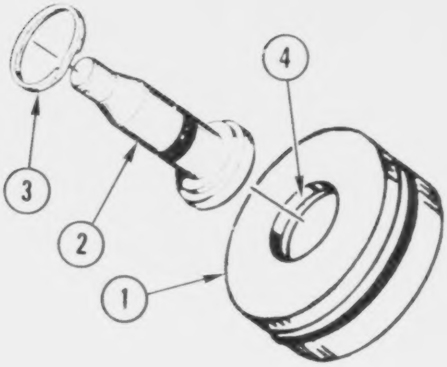
CAUTION

Shaft collar is installed under spring pressure. Do not lose parts when removing piston retaining pin.

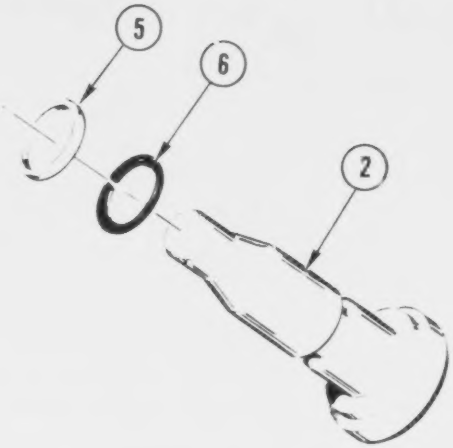
1. REMOVE SPRING (1).
   a. Using 9/16-inch open end wrench, press shaft collar (2) and spring (1).
   b. Remove pin (3) from brake piston rod (4).
   c. Slowly release pressure on spring (1). Remove collar (2) and spring.



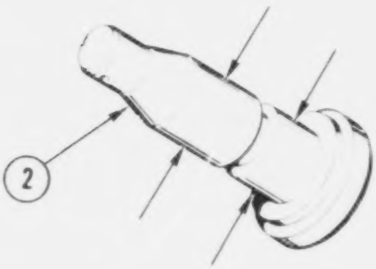
2. REMOVE PISTON ASSEMBLY (5) WITH ROD (4).



3. REMOVE PISTON ASSEMBLY (1) FROM ROD (2).
   - a. Remove retaining ring (3) from groove (4) in piston assembly (1). Discard retaining ring.
   - b. Remove and discard piston assembly (1).

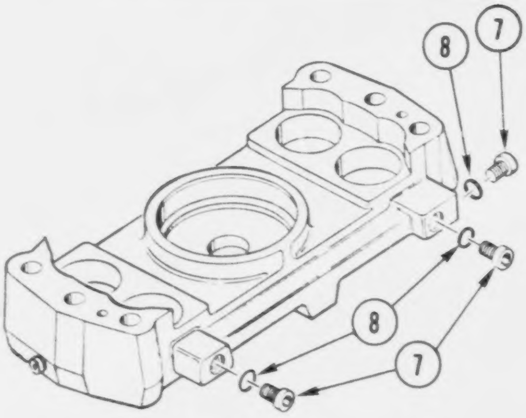


4. REMOVE AND DISCARD PACKING RETAINER (5) AND PREFORMED PACKING (6) FROM ROD (2).



5. CHECK ROD (2).
   - a. Using micrometer caliper set, measure diameter of rod (2) in two places.
   - b. Replace rod (2) if either measurement is less than 0.418 inch (10.62 mm).
   - c. Replace rod (2) if scored.

6. REPEAT STEPS 1 THROUGH 5 FOR REMAINING THREE PISTON ASSEMBLIES.



7. REMOVE THREE MACHINE THREAD PLUGS (7).
   - a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, remove three plugs (7).
   - b. Remove and discard three preformed packings (8).

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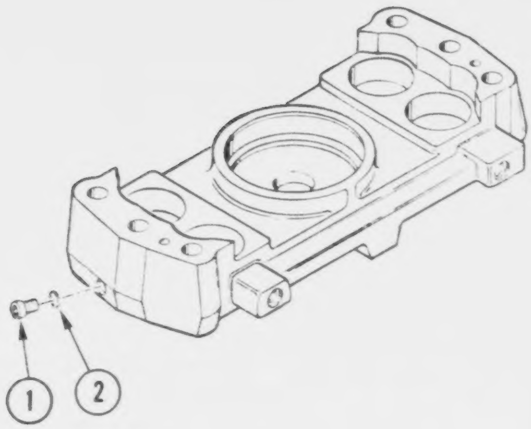
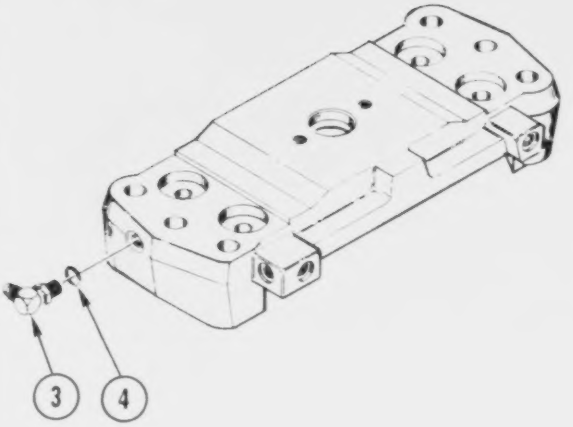
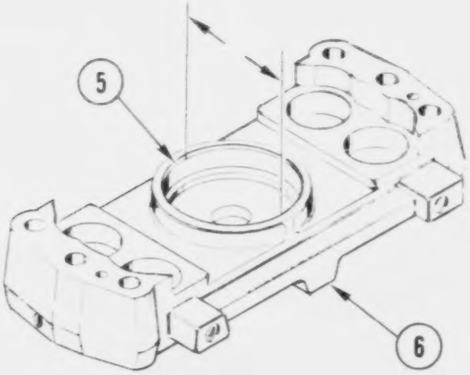


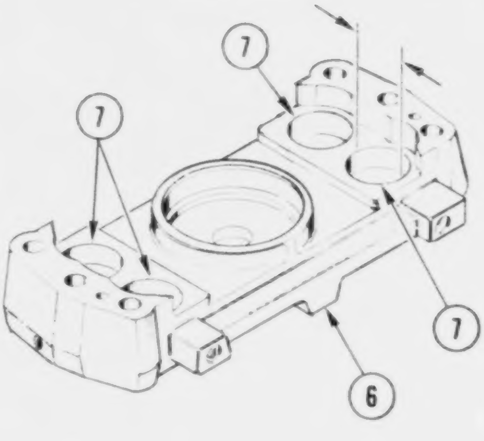
8. REMOVE MACHINE THREAD PLUG (1).
   - a. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, remove plug (1).
   - b. Remove and discard preformed packing (2).



9. REMOVE HOSE TO BOSS ELBOW (3) IF ATTACHED.
   - a. Unscrew elbow (3).
   - b. Remove and discard preformed packing (4).



10. CHECK BEARING BORE (5).
    - a. Using indicator caliper, measure bearing bore (5).
    - b. Replace left-hand brake assembly (6) if bearing bore (5) is greater than 4.529 inches (115.04 mm) in diameter. Go to step 14.

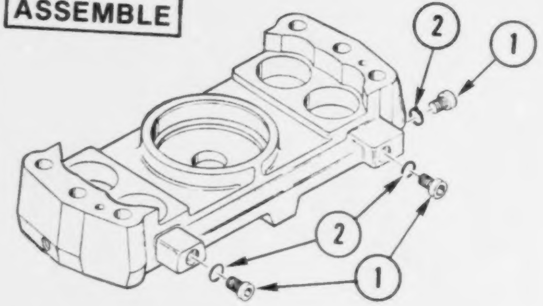


11. CHECK PISTON BORES (7).
    - a. Using telescoping gage set and micrometer caliper set, measure four piston bores (7).
    - b. Replace left-hand brake assembly (6) if any piston bore (7) is greater than 2.122 inches (53.90 mm) in diameter. Go to step 14.

12. CLEAN LEFT-HAND SINGLE DISK BRAKE.
    a. Clean assembly and hardware. See page 2-2.

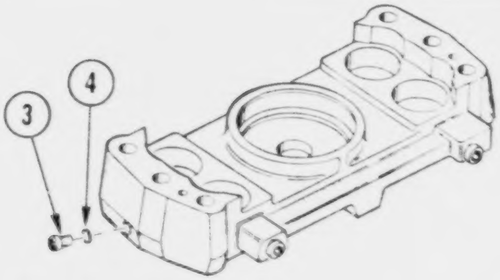
13. INSPECT LEFT-HAND SINGLE DISK BRAKE.
    a. Inspect assembly, piece parts, and inserts. See page 2-5.
    b. Replace brake assembly if damaged. Record failure on DA FORM 2407 and return defective brake assembly to depot. Go to step 14.
    c. Repair inserts if damaged. See task REPAIR LEFT-HAND SINGLE DISK BRAKE HOUSING INSERTS, page 4-268.

ASSEMBLE



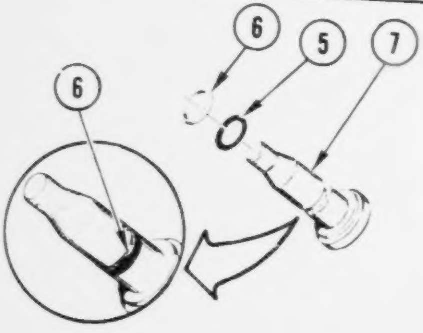
14. INSTALL THREE PLUGS (1).
    a. Coat three new preformed packings (2) with transmission oil.
    b. Install packing (2) on each of three plugs (1).
    c. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install three plugs (1).

15. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE THREE PLUGS (1) TO 110-120 in-lb (127-138 cmkg).



16. INSTALL PLUG (3).
    a. Coat new preformed packing (4) with transmission oil.
    b. Install packing (4) on plug (3).
    c. Using 3/8-inch drive ratchet handle and 1/8-inch socket wrench attachment, install plug (3).

17. USING 3/8-INCH DRIVE TORQUE WRENCH AND 1/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 75-85 in-lb (86-98 cmkg).



CAUTION

Packing retainer must be installed toward narrow end of rod. Damage to equipment can occur.

18. INSTALL NEW PREFORMED PACKING (5) AND NEW PACKING RETAINER (6) ON ROD (7).
    a. Coat new packing (5) with transmission oil.
    b. Install packing (5) and new packing retainer (6) on rod (7).

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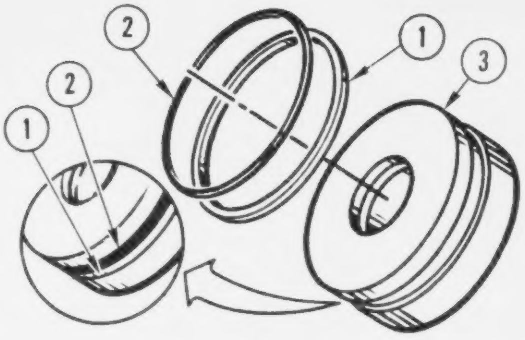
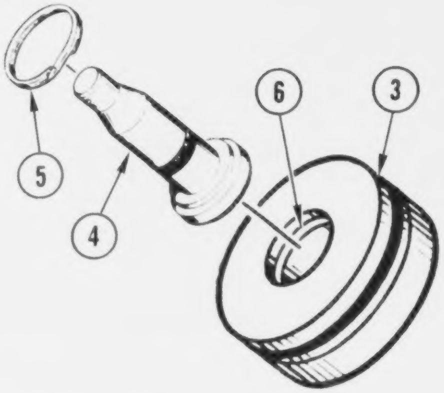


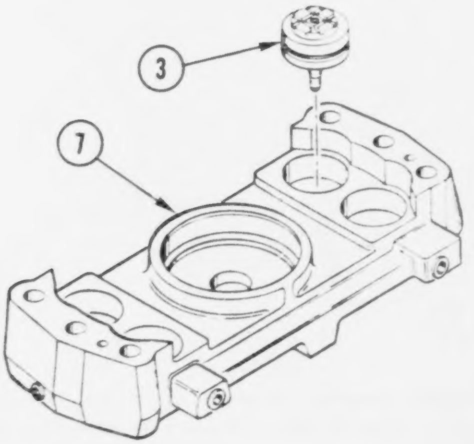
CAUTION
Packing retainer must be installed toward pad end of piston assembly. Damage to equipment can occur.

19. INSTALL NEW PACKING RETAINER (1) AND NEW PREFORMED PACKING (2) ON NEW PISTON ASSEMBLY (3).
    a. Coat new packing (2) with transmission oil.
    b. Place new packing retainer (1) and packing (2) on new piston.

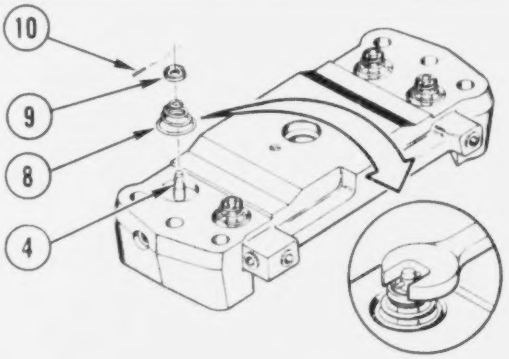


20. INSTALL ROD (4) IN PISTON ASSEMBLY (3).
    a. Install rod (4) in piston assembly (3). Press new retaining ring (5) into groove (6).

21. REPEAT STEPS 18, 19, AND 20 FOR REMAINING THREE RODS (4) AND PISTON ASSEMBLIES (3).



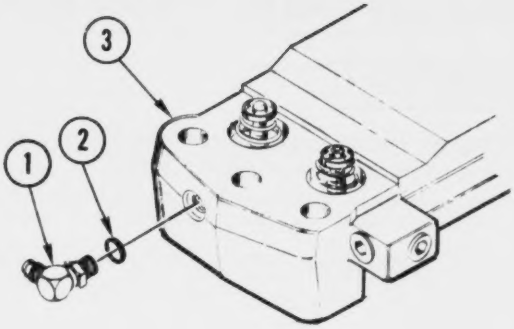
22. INSTALL PISTON ASSEMBLY (3) IN BRAKE HOUSING (7).
    a. Coat piston assembly (3) with tranmission oil.
    b. Press piston assembly (3) in brake housing (7).



23. INSTALL AND SECURE SPRING (8).
    a. Place spring (8) and collar (9) on rod (4). Install collar with cupped side up.
    b. Hold rod (4) in place. Using 9/16-inch open end wrench, press collar (9) until pin hole in rod is visible.
    c. Insert pin (10) through hole in rod (4).
    d. Release pressure on spring (8).

24. REPEAT STEPS 22 AND 23 FOR REMAINING THREE PISTON ASSEMBLIES.

25. INSTALL ELBOW (1) IF REMOVED.
    a. Coat new preformed packing (2) with transmission oil and install on elbow (1).
    b. Screw elbow (1) into brake housing (3). Hand tighten until captive washer makes firm contact with brake housing.



END OF TASK

REPAIR LEFT-HAND SINGLE DISK BRAKE HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the left-hand single disk brake housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

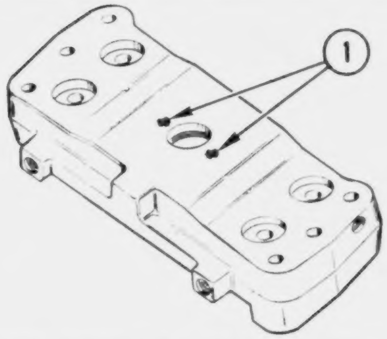
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Left-hand single disk brake housing on workbench. See page 4-262.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-13L SR258L	SR25R		SR25T	RZA12788-2 RZA12656-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
	M45932/3-13L SRW258L	SRW25R	SRW25D	SRW25T	RZA12789-2 RZA12791-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)

END OF TASK

Section VIII. RIGHT-HAND OUTPUT HOUSING

TASK INDEX

Task	Page
Replace Right-Hand Output Housing	4-270
Repair Right-Hand Output Housing	4-279
Replace Right-Hand Output Carrier Assembly	4-294
Repair Right-Hand Output Carrier Assembly	4-304
Repair Right-Hand Output Housing Inserts	4-308
Repair Right-Hand Brake Actuating Plate Inserts	4-310
Repair Right-Hand Retainer Plate Assembly Insert	4-312

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE RIGHT-HAND OUTPUT HOUSING

DESCRIPTION

This task covers: Remove (page 4-270). Install (page 4-275).

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- Crowfoot attachment — (Item 21, App C)
- Fixture removal assembly — (Item 29, App C)
- Flat washer — (Item 30, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Hex-head cap screw — (Item 36, App C)
- Lever arm — (Item 43, App C)
- Output housing installer — (Item 57, App C)
- Self locking nut — (Item 67, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Petrolatum — (Item 7, App B)
- Wiping rag — (Item 13, App B)
- Wood block (2) — (Item 4, App D)
- Gasket
- Gasket
- Lock washer (10)
- Lock washer (28)

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

Equipment Conditions:

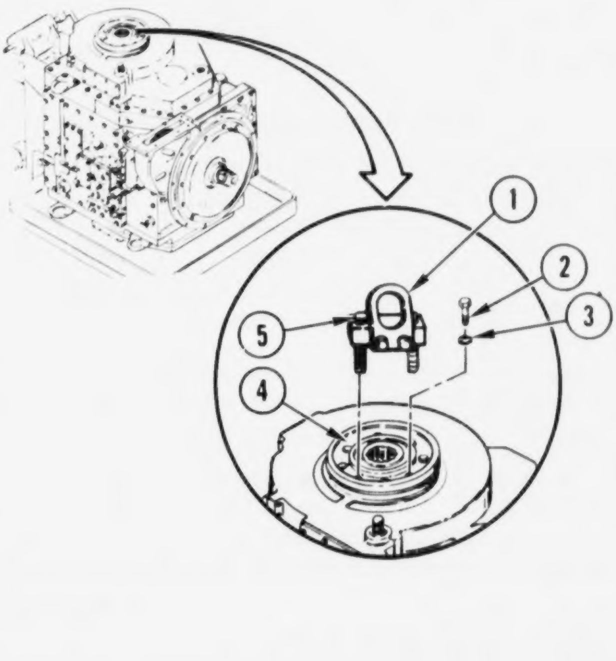
- Transmission mounted on tip-over stand. See page 2-144.

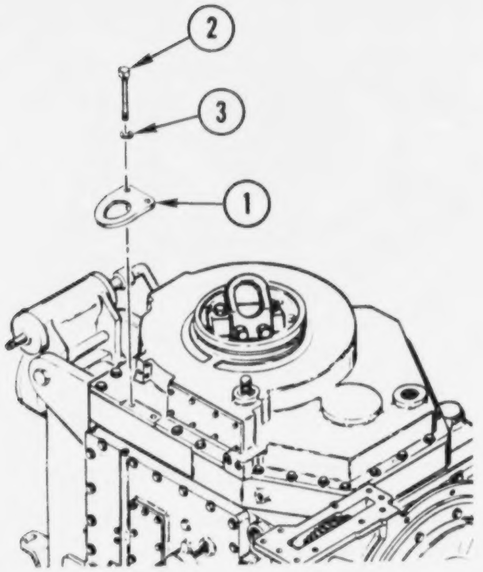
REMOVE

WARNING

Fixture removal assembly must be installed in position shown. Output housing is heavy. Improper installation of removal assembly can cause an uneven lift and injury to personnel.

1. INSTALL FIXTURE REMOVAL ASSEMBLY (1).
   a. Remove two screws (2) and lock washers (3).
   b. Put removal assembly (1) on output carrier (4).
   c. Tighten two screws (5).

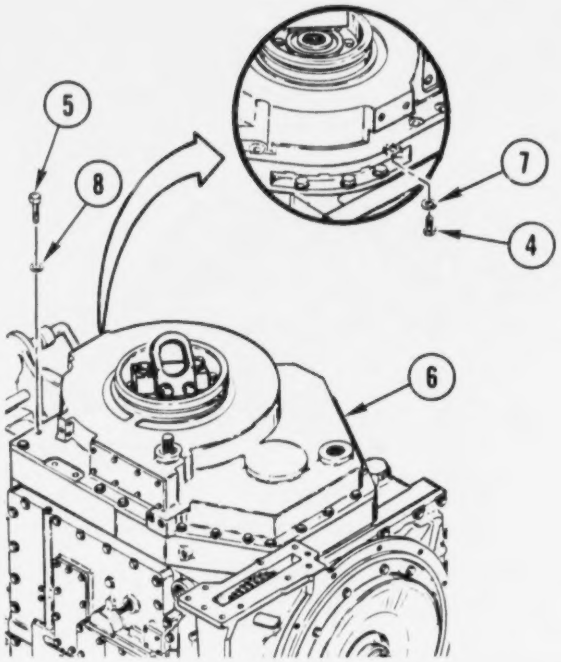




2. REMOVE LIFTING EYE (1).

   a. Remove two screws (2) and lock washers (3). Discard lock washers.

   b. Remove eye (1).



3. REMOVE SCREWS (4) AND (5) FROM RIGHT-HAND OUTPUT HOUSING (6).

   a. Remove four screws (4) and lock washers (7). Discard lock washers.

   b. Remove 22 screws (5) and lock washers (8). Discard lock washers.

---

4. ATTACH LIFTING DEVICE (9) TO REMOVAL ASSEMBLY (10).

WARNING

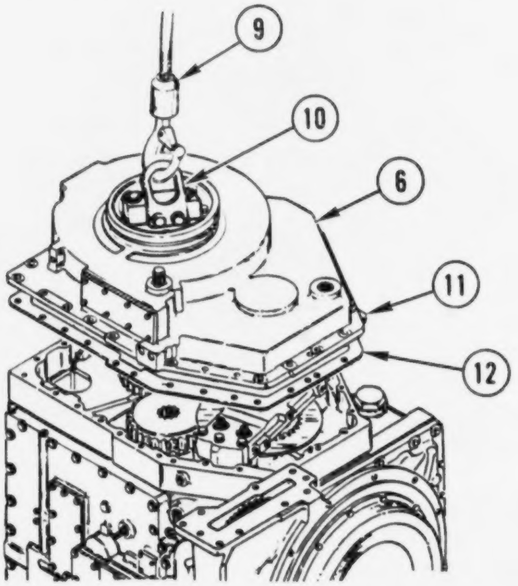
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

5. REMOVE OUTPUT HOUSING (6).

   a. Loosen output housing (6) using pry point (11).

   b. Evenly lift output housing (6). Remove and discard gasket (12).

   c. Lower output housing (6) onto work surface.



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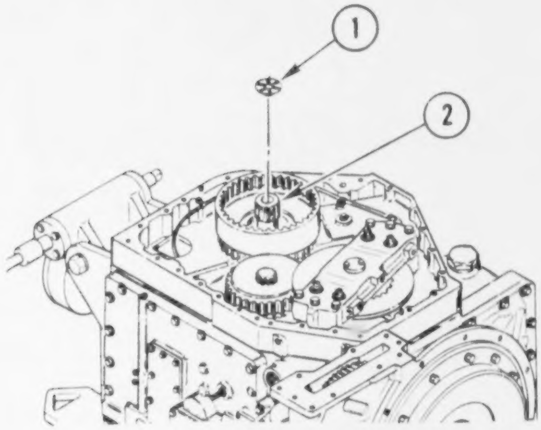
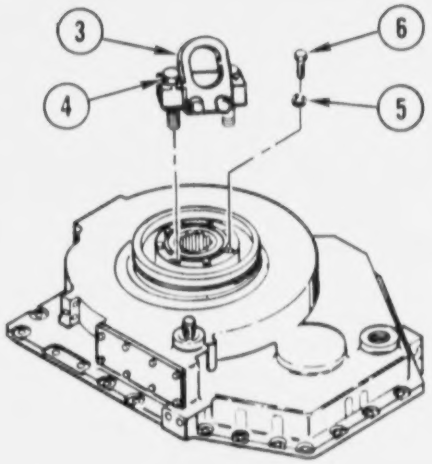


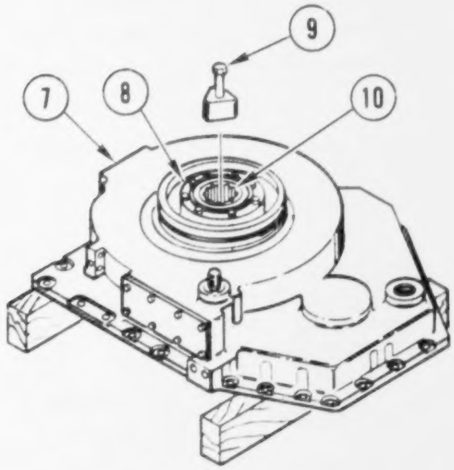
NOTE
Thrust washer can be in carrier.

6. REMOVE THRUST WASHER (1) FROM SPUR GEAR (2).

7. INSPECT THRUST WASHER (1) FOR DAMAGE. See page 2-5.
   a. Replace thrust washer if damaged.

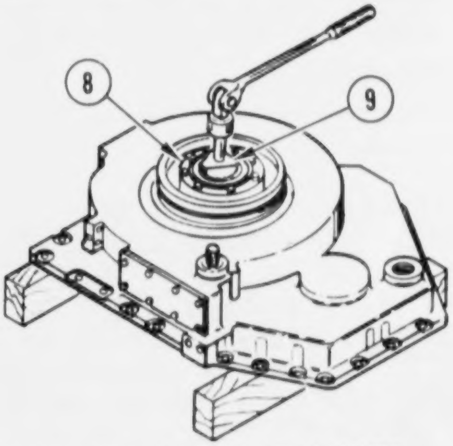


8. REMOVE REMOVAL ASSEMBLY (3).
   a. Unscrew two screws (4) and remove removal assembly (3).
   b. Install two lock washers (5) and screws (6).



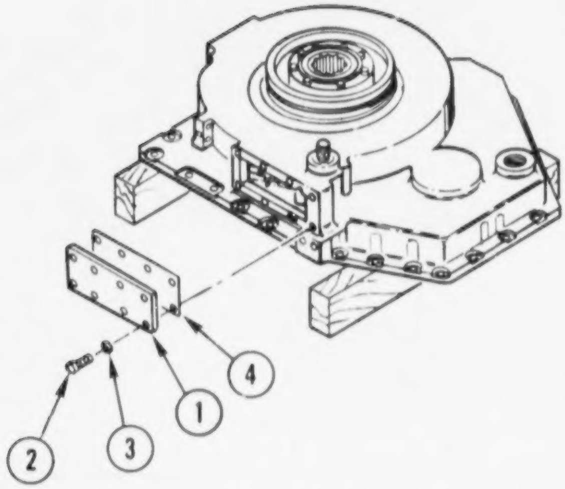
9. PLACE OUTPUT HOUSING (7) ON TWO WOOD BLOCKS SO THAT CARRIER (8) IS FREE TO ROTATE.

10. INSTALL OUTPUT HOUSING INSTALLER (9) INTO SPLINED OUTPUT SHAFT (10).

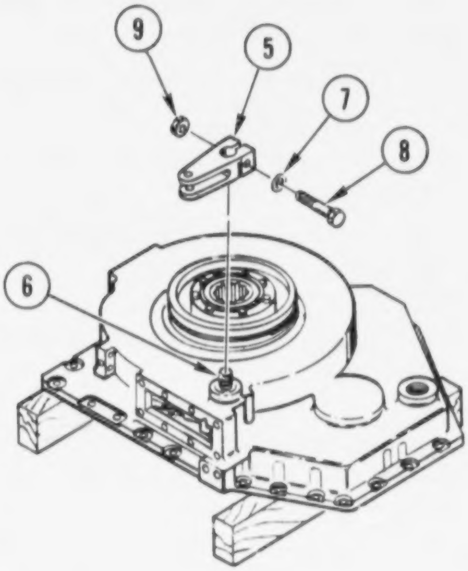


11. USING 3/8-INCH DRIVE HINGED HANDLE AND 3/4-INCH SOCKET, ROTATE CARRIER (8).
    a. If carrier (8) cannot be rotated, remove output installer (9) and go to step 12. If carrier can be rotated, remove installer and go to step 13.

12. REPAIR RIGHT-HAND OUTPUT HOUSING, page 4-279.



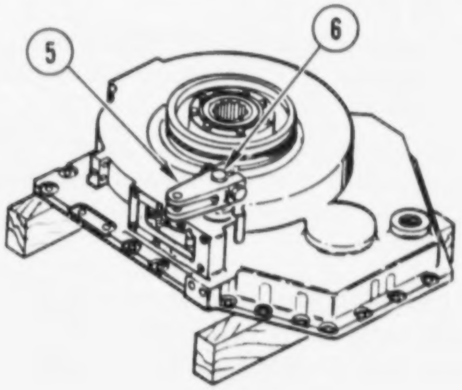
13. REMOVE ACCESS COVER (1), IF INSTALLED.
    a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove eight screws (2) and lock washers (3). Discard lock washers.
    b. Remove cover (1) and gasket (4). Discard gasket.



14. ATTACH LEVER ARM (5) TO SHOULDERED SHAFT (6).
    a. Position lever arm (5).
    b. Install washer (7), screw (8), and self-locking nut (9).

15. ROTATE LEVER ARM (5) AND APPLY FIRM PRESSURE TO ACTUATE BRAKES.
    a. If shaft (6) does not rotate, go to step 20. If shaft does rotate, go to step 17.

16. (DELETED)



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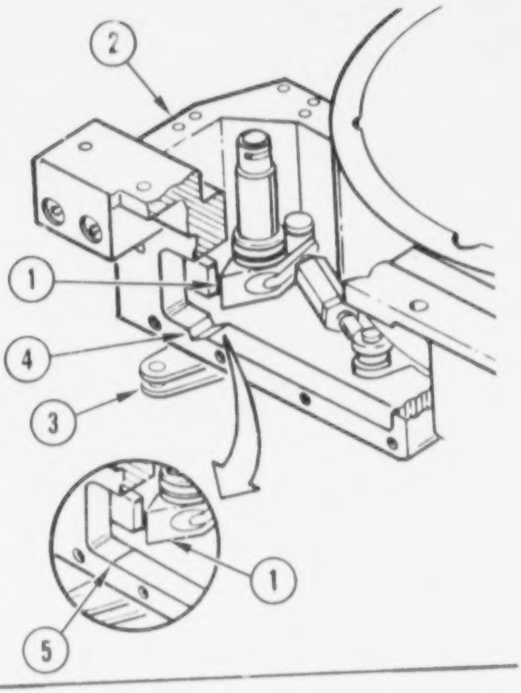
NOTE

Two different alinement indicators are used in the output assemblies.

17. CHECK ALINEMENT OF SHOULDERED SHAFT POINTER (1).
    a. Repairer and helper turn right-hand output housing (2) over.
    b. Rotate lever arm (3) and apply firm pressure.
    c. Check that pointer (1) alines with v-groove indicator (4) or scribe mark indicator (5).
    d. If pointer (1) does not aline with indicator (4) or (5), go to step 18. If pointer does aline with indicator, go to step 19.



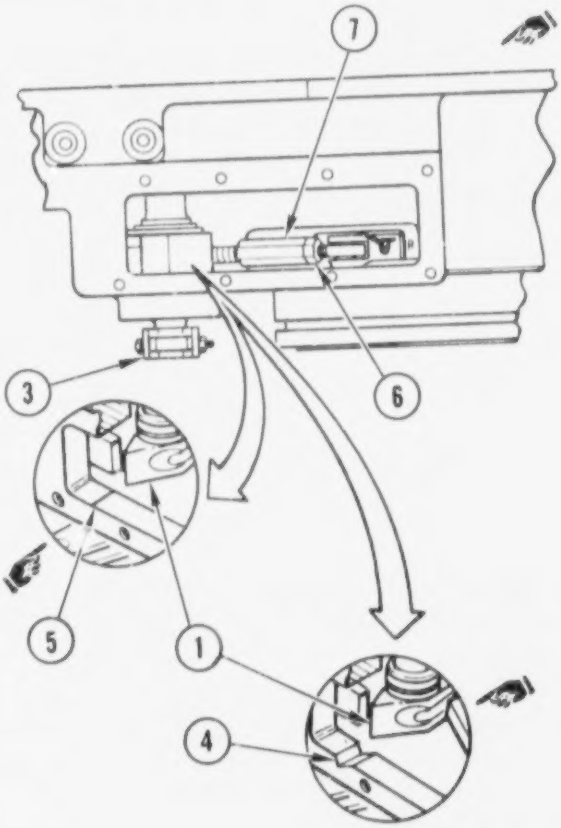
NOTE

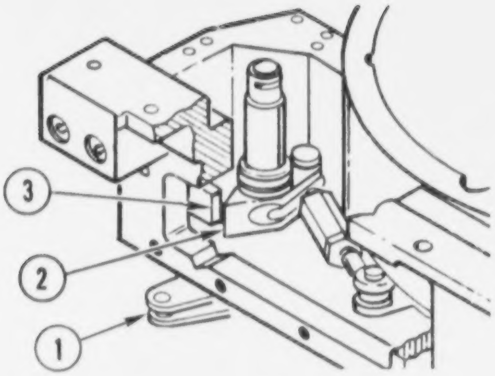
Two different alinement indicators are used in the output assemblies.

This procedure contains only a coarse pointer adjustment. The fine pointer adjustment is done in the vehicle.

18. ADJUST POINTER (1).
    a. Release lever arm (3). Loosen jam nut (6).
    b. Adjust pointer (1) by rotating adjuster nut (7). Tighten jam nut (6).
    c. Rotate lever arm (3) and apply firm pressure.
    d. Check that pointer (1) alines with v-groove indicator (4) or scribe mark indicator (5).
    e. If pointer (1) does aline, go to step 18.1. If after repeated adjustments pointer (1) will not aline, go to step 20.

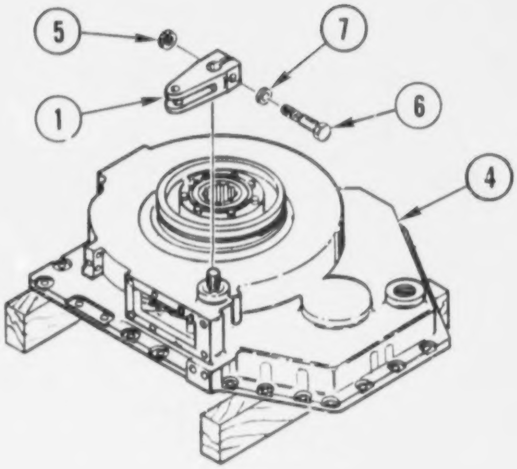
18.1 USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 9/16-INCH CROWFOOT, TORQUE NUT (6) TO 17-20 ft-lb (2-3 mkg).





19. RELEASE LEVER ARM (1).
    a. If pointer (2) does not rest against stop (3), go to step 20. If pointer does rest against stop, go to step 21.

20. REPAIR RIGHT-HAND OUTPUT HOUSING, page 4-279.



20.1 IF REPAIR RIGHT-HAND OUTPUT HOUSING TASK WAS PERFORMED, GO TO STEP 13. IF NOT GO TO STEP 21.

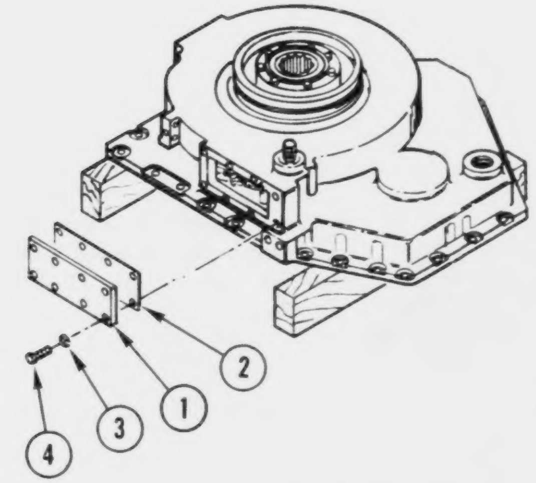
21. REMOVE LEVER ARM (1).
    a. Repairer and helper turn output housing (4) over.
    b. Remove self-locking nut (5), screw (6), and washer (7).
    c. Remove lever arm (1).

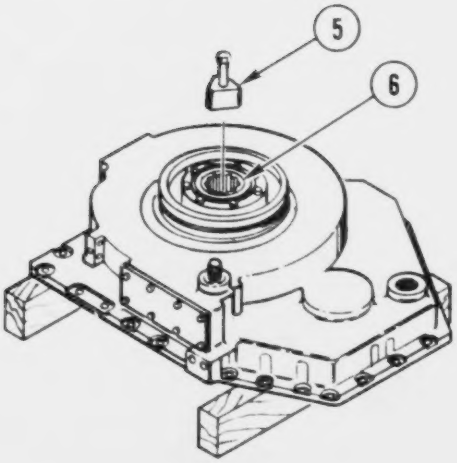
INSTALL

22. (DELETED)

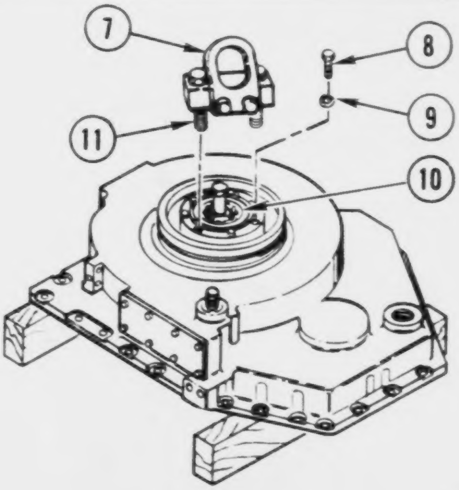
23. INSTALL COVER (1) IF REMOVED.
    a. Install new gasket (2) and cover (1).
    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install eight new lock washers (3) and screws (4).

24. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (4) TO 75-85 in-lb (86-98 cmkg).





25. INSTALL OUTPUT HOUSING INSTALLER (5) INTO SPLINED OUTPUT SHAFT (6).



WARNING

Fixture removal assembly must be installed in position shown. Output housing is heavy. Improper installation of removal assembly can cause an uneven lift and injury to personnel.

26. INSTALL REMOVAL ASSEMBLY (7).
    a. Remove two screws (8) and lock washers (9). Discard lock washers.
    b. Put removal assembly (7) on carrier (10).
    c. Tighten two screws (11).

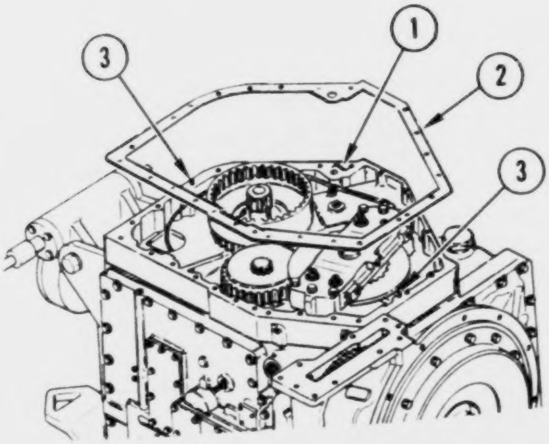
GO TO NEXT PAGE

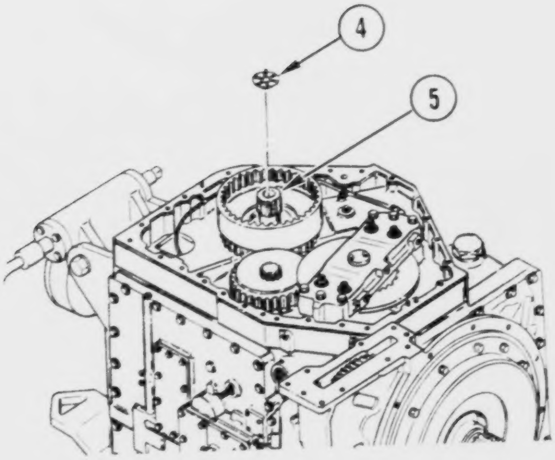
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

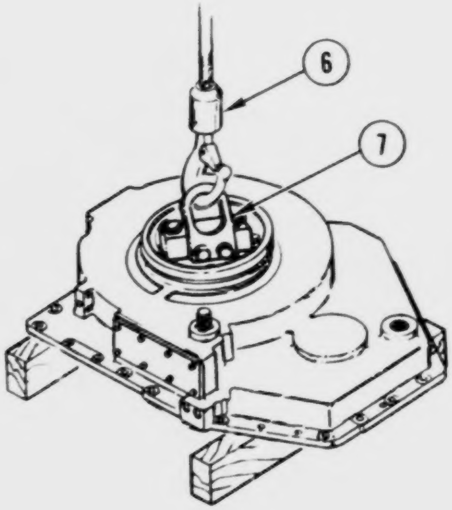
27. CLEAN GASKET MOUNTING SURFACE (1).
    a. Use wiping rag dampened with cleaning solvent.

28. INSTALL NEW GASKET (2).
    a. Apply petrolatum to mounting surface (1).
    b. Install gasket (2) over two pins (3).





29. INSTALL THRUST WASHER (4) ON GEAR (5).

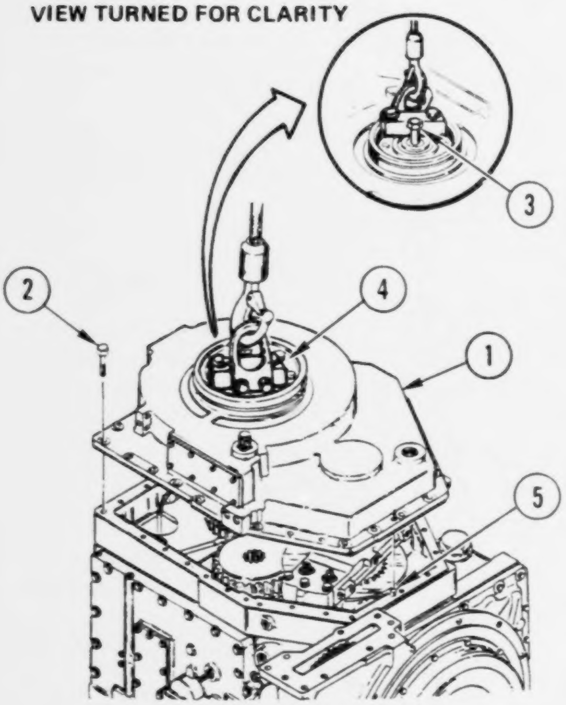


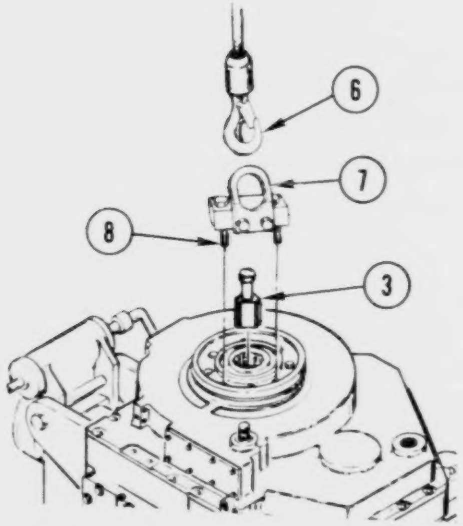
30. ATTACH LIFTING DEVICE (6) TO REMOVAL ASSEMBLY (7).

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

31. REPAIRER AND HELPER INSTALL OUTPUT HOUSING (1).
    a. Lift output housing (1).
    b. Slowly lower output housing (1) into place. Use four long screws (2) for alinement, one in each corner. Do not tighten screws (2).
    c. (H) Use 3/8-inch drive hinged handle and 3/4-inch socket on output installer (3). Rotate carrier (4) until output housing (1) drops into place over [illegible] (5). Remove four screws (2).
    d. (H) Turn installer (3) one complete turn to be sure output housing (1) is properly seated.

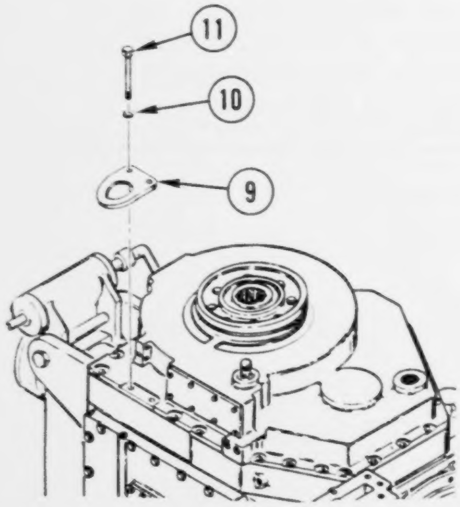




32. DETACH LIFTING DEVICE (6).

33. REMOVE REMOVAL ASSEMBLY (7).
    a. Unscrew two screws (8).
    b. Remove removal assembly (7).

34. REMOVE INSTALLER (3).



35. INSTALL LIFTING EYE (9).
    a. Secure eye (9) with two new lock washers (10) and 4 3/4-inch screws (11).

36. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (11) TO 40-45 ft-lb (6 mkg).

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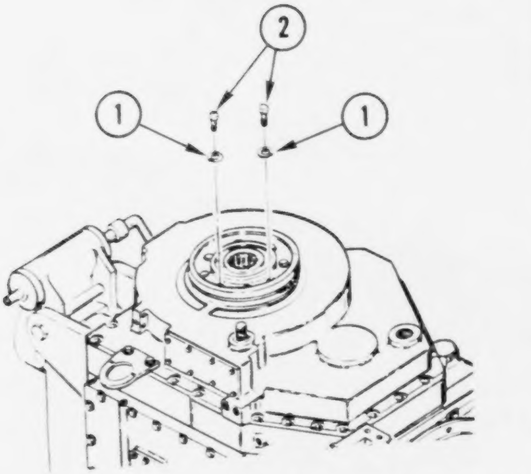
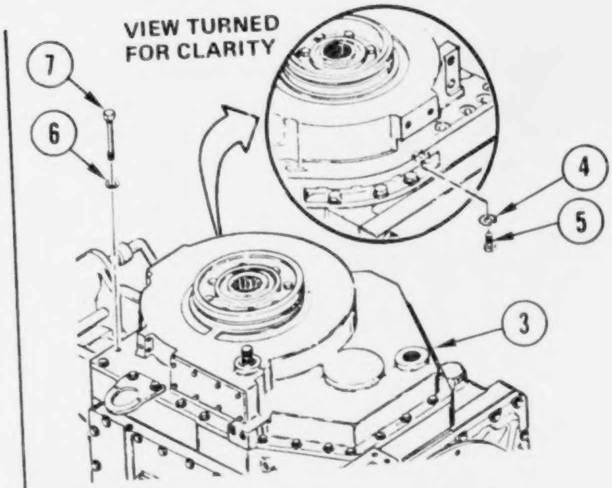


37. INSTALL TWO NEW LOCK WASHERS (1) AND SCREWS (2).

38. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (2) TO 75-100 in-lb (86-115 cmkg).



39. SECURE OUTPUT HOUSING (3).
   - a. Install four new lock washers (4) and short screws (5).
   - b. Install 22 new lock washers (6) and long screws (7).

40. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/8-INCH CROWFOOT, TORQUE FOUR SCREWS (5) TO 40-45 ft-lb (6 mkg).

41. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 22 SCREWS (7) TO 40-50 ft-lb (6 mkg).

END OF TASK

REPAIR RIGHT-HAND OUTPUT HOUSING

DESCRIPTION

This task covers: Disassembly (page 4-279). Assemble (page 4-286)

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer caliper set — (Item 52, App C)
- Retaining-ring pliers — (Item 60, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 81, App C)
- Socket wrench attachment — (Item 82, App C)
- Socket wrench set — (Item 89, App C)
- Telescoping gage set — (Item 93, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Wire-twister pliers — (Item 107, App C)

Materials/Parts:

- Lockwire — (Item 5, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Cotter pin
- Gasket
- Gasket
- Lock washer (8)
- Preformed packing (2)
- Retaining ring
- Special rubber seal

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

References:

- TM 9-214

Equipment Conditions:

- Right-hand output housing on workbench. See page 4-270.

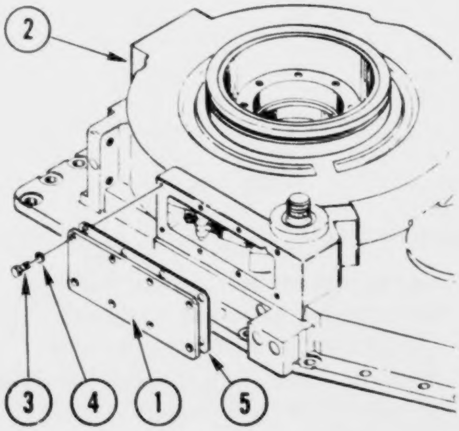
DISASSEMBLE

1. REMOVE RIGHT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-294.

2. REMOVE ACCESS COVER (1) FROM RIGHT-HAND OUTPUT HOUSING (2).

   a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove eight screws (3) and lock washers (4). Discard lock washers.

   b. Remove cover (1) and gasket (5). Discard gasket.



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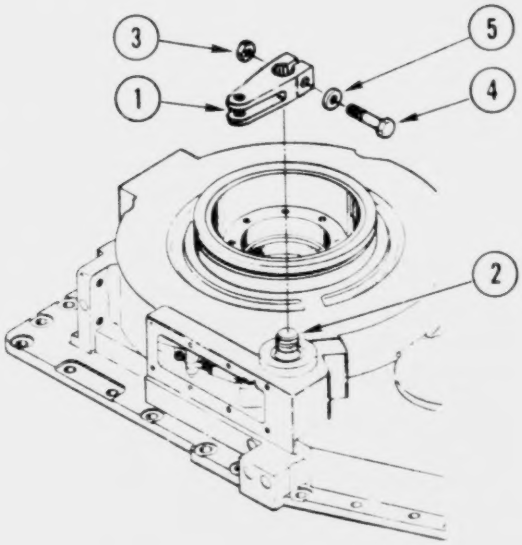
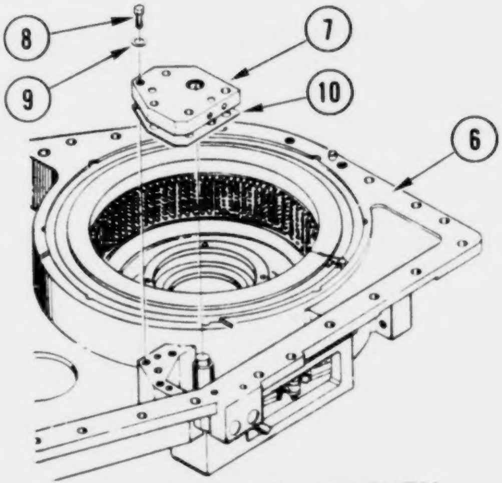
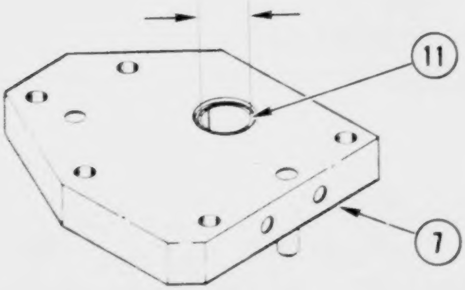


3. IF LEVER ARM (1) IS INSTALLED, REMOVE FROM SHOULDERED SHAFT (2).
    a. Remove self-locking nut (3), screw (4) and washer (5).
    b. Remove lever arm (1) from shaft (2).

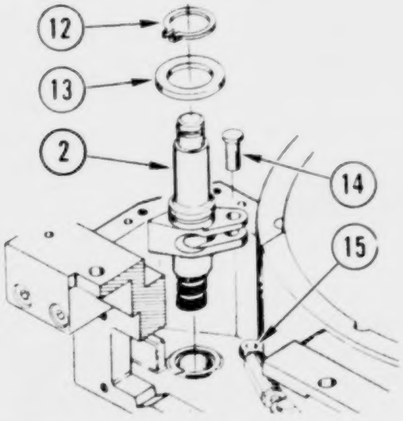


4. REPAIRER AND HELPER TURN OUTPUT HOUSING (6) OVER.

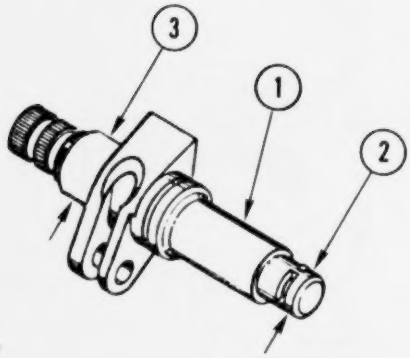
5. REMOVE VALVE PLATE ASSEMBLY (7).
    a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove five screws (8) and washers (9).
    b. Using plastic-faced hammer, remove plate (7) and gasket (10). Discard gasket.



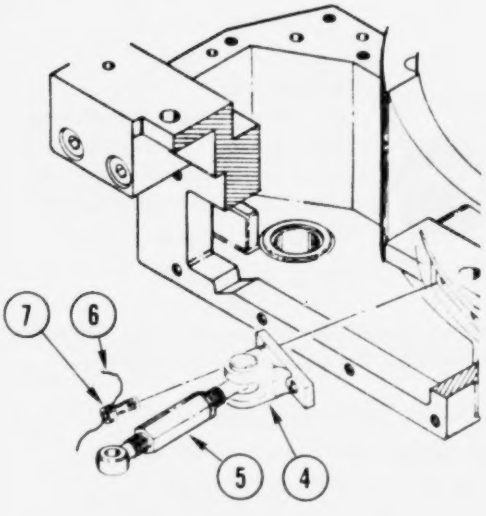
6. CHECK VALVE PLATE ASSEMBLY (7).
    a. Using micrometer caliper set and telescoping gage set, measure inside diameter of bushing (11). Replace plate (7) if measurement is greater than 0.7513 inch (19.083 mm).



7. REMOVE SHOULDERED SHAFT (2).
    a. Using retaining-ring pliers, remove and discard retaining ring (12).
    b. Remove shim (13).
    c. Remove pin (14) and slide rod end connector (15) out of shaft (2).
    d. Remove shaft (2).



8. CHECK SHOULDERED SHAFT (1).
   a. Using micrometer caliper set, measure diameter (2). Replace shaft (1) if measurement is less than 0.7490 inch (19.025 mm).
   b. Using micrometer caliper set, measure diameter (3). Replace shaft (1) if measurement is less than 0.9990 inch (25.375 mm).

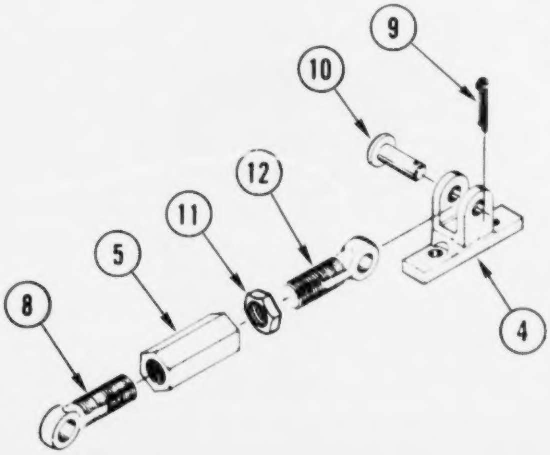


NOTE
All brake adjuster screws do not use lockwire.

9. REMOVE ROD END CLEVIS (4) AND BRAKE ADJUSTER (5).
   a. Remove and discard lockwire (6), if used, from two screws (7).
   b. Using 3/8-inch drive brace handle and 1/4-inch socket wrench attachment, remove two screws (7).
   c. Remove clevis (4) with adjuster (5).

NOTE
Rod end connector (8) has left-hand threads.

10. DISASSEMBLE ROD END CLEVIS (4) AND ADJUSTER (5).
    a. Remove and discard cotter pin (9).
    b. Remove pin (10) from clevis (4).
    c. Loosen hexagon nut (11) and remove two rod end connectors (8) and (12) from adjuster (5).
    d. Remove nut (11) from rod end connector (12).



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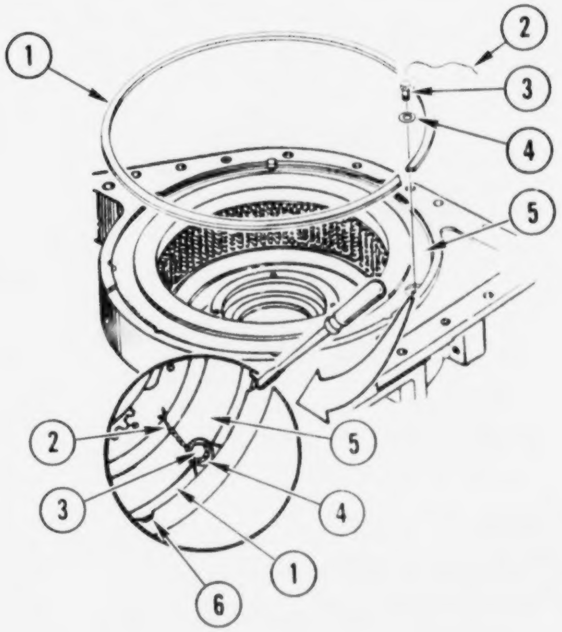
WARNING

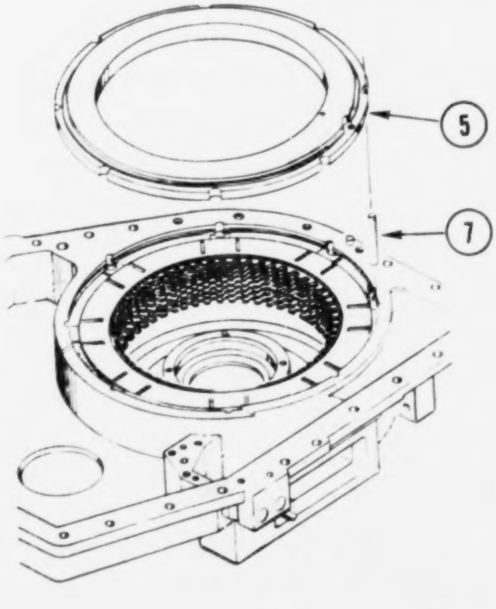
Use care when removing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

CAUTION

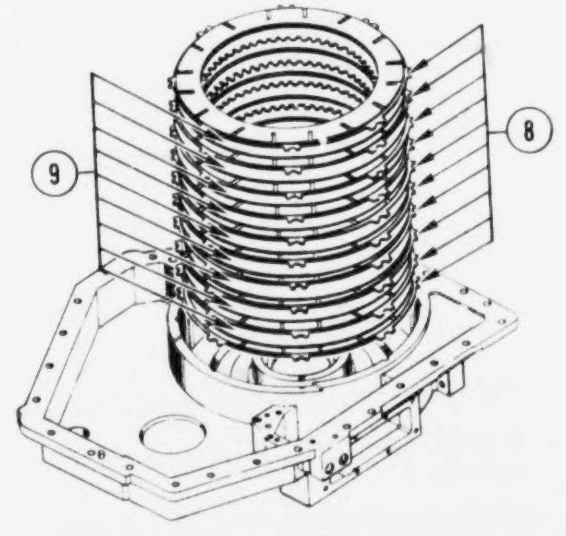
Do not mar housing while prying out retaining ring. Damage to equipment can occur.



11. REMOVE RETAINING RING (1).
    a. Remove and discard lockwire (2).
    b. Using 3/8-inch drive brace handle and 3/8-inch socket, remove bolt (3) and washer (4).
    c. Push down on retainer plate (5) and using screwdriver, pry out retaining ring (1). Use notches (6) as pry points.



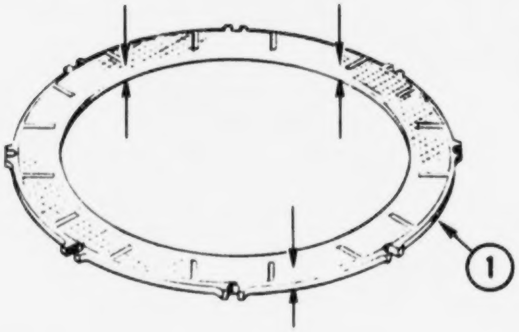
12. REMOVE RETAINER PLATE (5) AND EIGHT PINS (7).



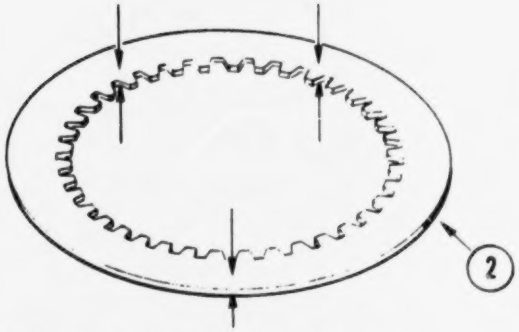
NOTE

Plates should be installed in same order and facing same way as removed.

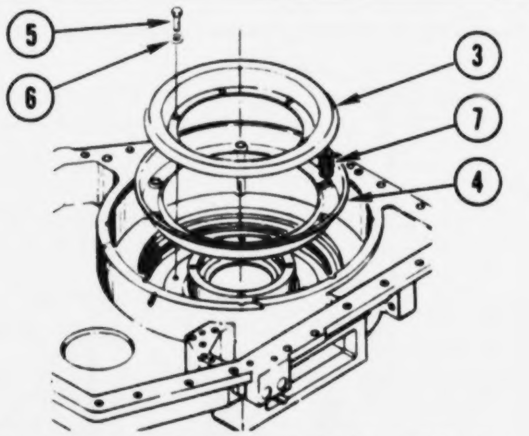
13. REMOVE 10 STATIONARY SERVICE BRAKE PLATES (8) AND 9 ROTATING SERVICE BRAKE PLATES (9).



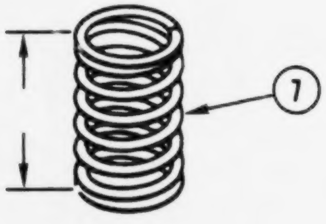
14. CHECK 10 STATIONARY BRAKE PLATES (1).
    a. Using micrometer caliper set, measure thickness of each plate (1) in three places. Replace all 19 plates if any plate measures less than 0.080 inch (2.03 mm), and go to step 16.
    b. Using flat surface, and feeler gage, check for warpage on both inside and outside edges. Replace all 19 plates if warpage of any plate (1) is greater than 0.010 inch (.25 mm), go to step 16.



15. CHECK NINE ROTATING BRAKE PLATES (2).
    a. Using micrometer caliper set, measure thickness of each plate (2) in three places. Replace all 19 plates if any plate (2) measures less than 0.093 inch (2.36 mm), and go to step 16.
    b. Using flat surface and feeler gage, check for warpage on both inside and outside edges. Replace all 19 plates if warpage of any plate (2) is greater than 0.010 inch (.25 mm).



16. REMOVE INNER SPRING RETAINER (3) AND SPRING RETAINER PLATE (4).
    a. Using 3/8-inch drive brace handle and 7/16-inch socket, loosen six screws (5). Loosen two turns at a time to evenly relieve spring pressure.
    b. Remove six screws (5) and washers (6).
    c. Remove retainer (3), 10 springs (7), and plate (4).



17. CHECK 10 SPRINGS (7).
    a. Using indicator caliper, measure free length of spring (7). Replace spring if free length is less than 1.5 inch (38 mm).
    b. Repeat step 17a for all springs (7).

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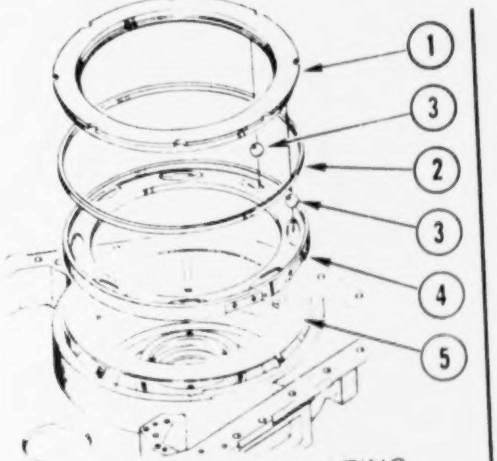


18. REMOVE INNER BRAKE ACTUATING PLATE (1).

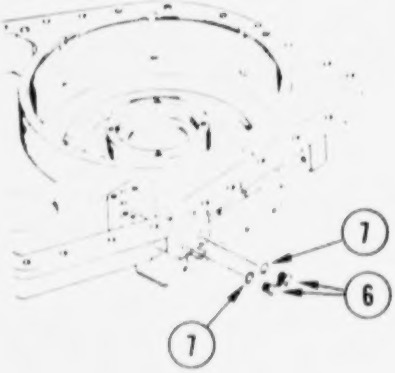
   a. Lift out plate (1).

   b. Remove and discard special rubber seal (2).

   c. Remove eight bearing balls (3).

19. REMOVE OUTER BRAKE ACTUATING PLATE (4).

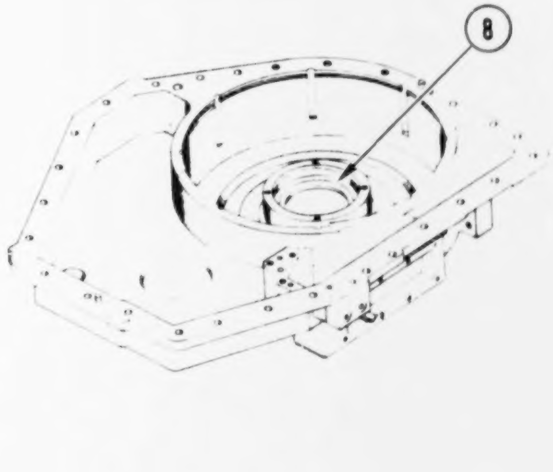
20. REMOVE THRUST WASHER (5).



21. REMOVE TWO MACHINE THREAD PLUGS (6).

   a. Using 3/8-inch drive brace handle and 3/16-inch socket wrench attachment, remove two plugs (6).

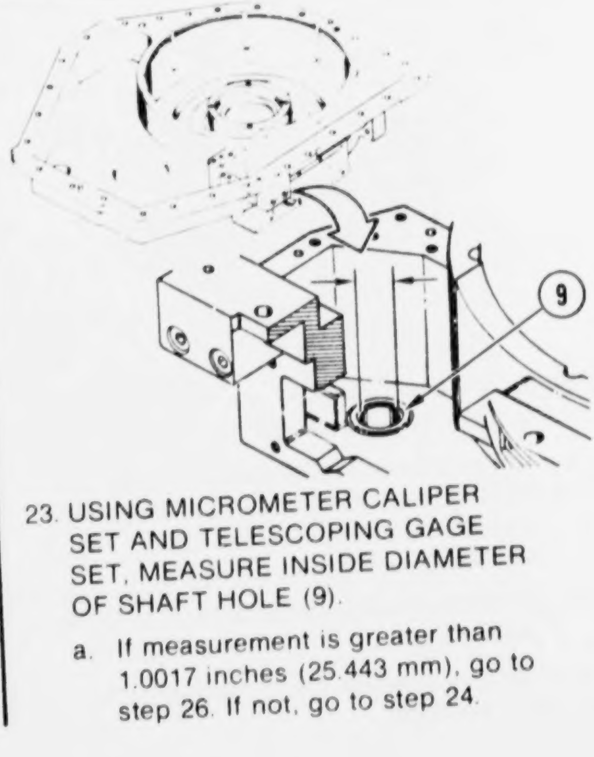
   b. Remove and discard two preformed packings (7).



22. INSPECT TAPERED ROLLER CUP (8).

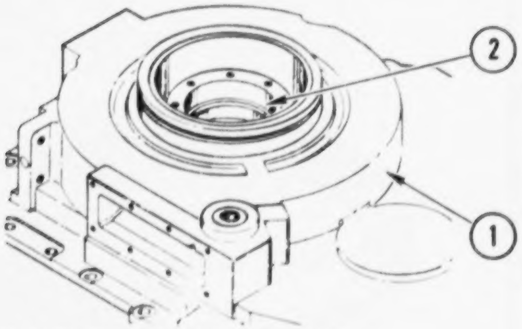
   a. Inspect cup (8) for damage. See TM 9-214.

   b. If cup (8) is damaged, go to step 26. If not, go to step 23.



23. USING MICROMETER CALIPER SET AND TELESCOPING GAGE SET, MEASURE INSIDE DIAMETER OF SHAFT HOLE (9).

   a. If measurement is greater than 1.0017 inches (25.443 mm), go to step 26. If not, go to step 24.

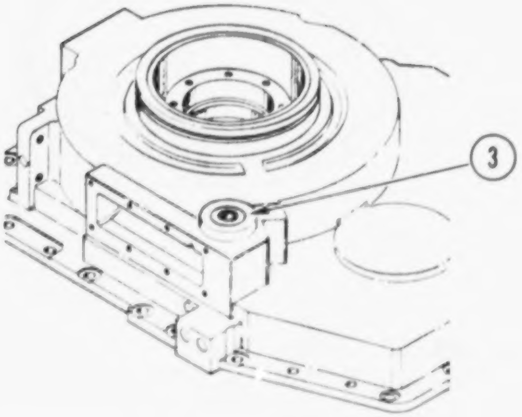


24. REPAIRER AND HELPER TURN HOUSING (1) OVER.

25. INSPECT TAPERED ROLLER CUP (2).
    a. Inspect cup (2) for damage. See TM 9-214.
    b. If cup (2) is damaged, go to step 26. If not, go to step 28.

26. REPLACE RIGHT-HAND OUTPUT MECHANICAL HOUSING (1). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING TO DEPOT.

27. GO TO STEP 32.



28. INSPECT ENCASED SEAL (3).
    a. Inspect seal (3) for scoring, cuts, or other damage. See page 2-5.
    b. If seal (3) is damaged, go to step 29. If seal is not damaged, go to step 30.

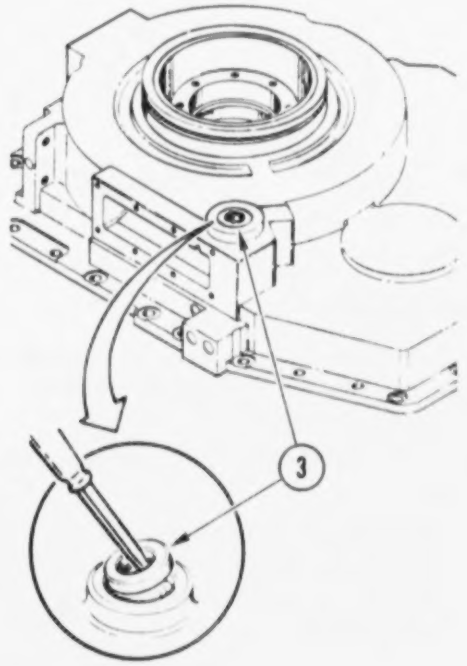
CAUTION

Do not mar housing while prying out seal. Damage to equipment can occur.

29. REMOVE SEAL (3).
    a. Using screwdriver, pry out and discard seal (3).

30. CLEAN RIGHT-HAND OUTPUT MECHANICAL HOUSING.
    a. Clean housing and piece parts. See page 2-2.

31. INSPECT RIGHT-HAND OUTPUT MECHANICAL HOUSING.
    a. Inspect housing, piece parts, and inserts. See page 2-5.
    b. Replace housing if damaged. Record failure on DA FORM 2407 and return defective housing to depot.
    c. Repair inserts if damaged. See task REPAIR RIGHT-HAND OUTPUT HOUSING INSERTS, page 4-308.



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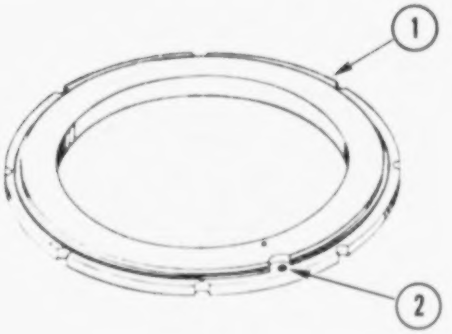
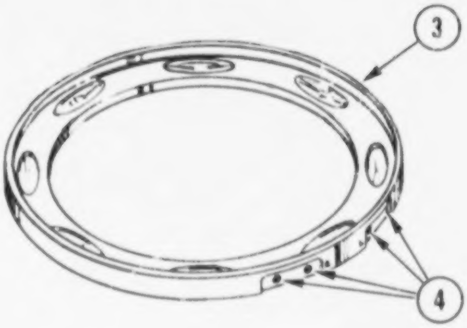
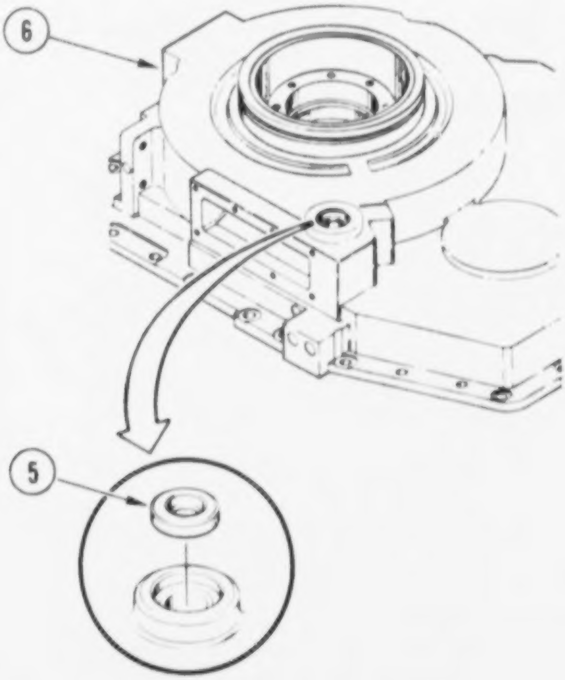


32. INSPECT RIGHT-HAND RETAINER PLATE ASSEMBLY (1).
    a. Inspect plate (1) and insert (2) for damage. See page 2-5.
    b. Repair insert if damaged. See task REPAIR RIGHT-HAND RETAINER PLATE ASSEMBLY INSERT, page 4-312.



33. INSPECT RIGHT-HAND OUTER BRAKE ACTUATING PLATE (3).
    a. Inspect plate (3) and inserts (4) for damage. See page 2-5.
    b. Repair inserts if damaged. See task REPAIR RIGHT-HAND BRAKE ACTUATING PLATE INSERTS, page 4-310.

ASSEMBLE

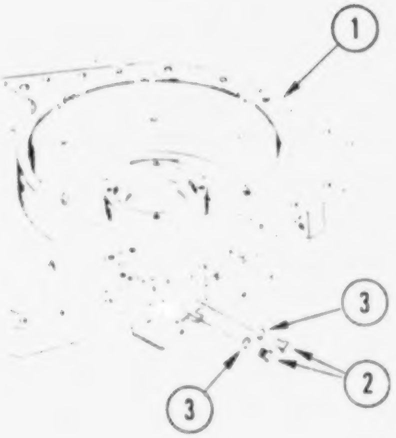


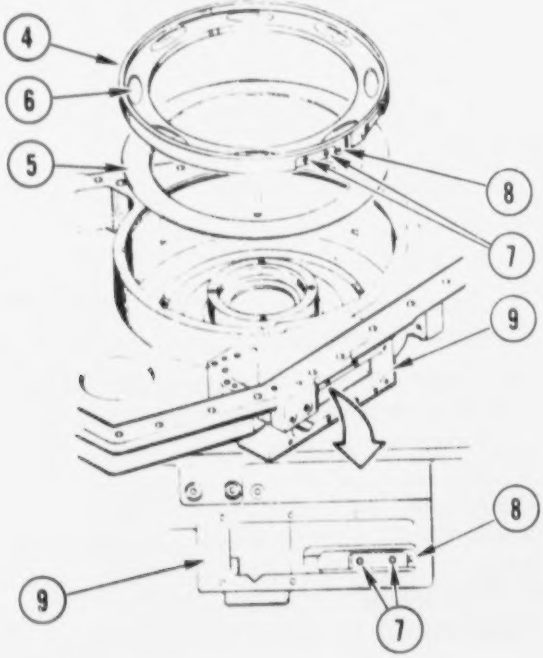
34. INSTALL NEW SEAL (5).
    a. If seal (5) was removed or housing (6) was replaced, go to step 34b. If not, go to step 35.
    b. Coat new seal (5) with transmission oil.
    c. Using plastic-faced hammer, tap seal (5) into place with flat metal surface facing outward until seal is fully seated.

35. REPAIRER AND HELPER TURN HOUSING (1) OVER.

36. INSTALL TWO PLUGS (2).
    a. Coat two new preformed packings (3) with transmission oil. Install packings on two plugs (2).
    b. Using 3/8-inch drive brace handle and 3/16-inch socket wrench attachment, install two plugs (2).

37. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO PLUGS (2) TO 110-120 in-lb (127-138 cmkg).





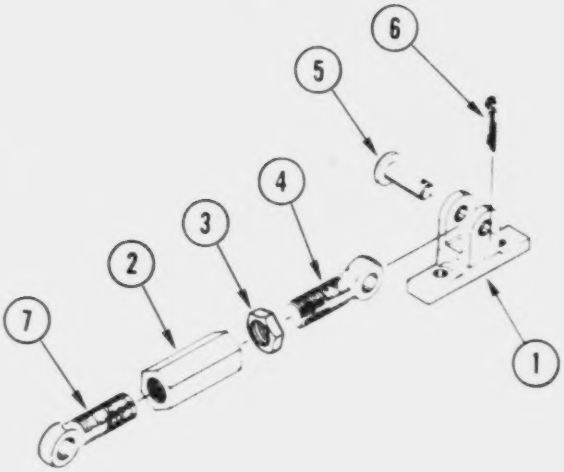
38. INSTALL OUTER BRAKE ACTUATING PLATE (4).
    a. Coat thrust washer (5) with transmission oil and install.
    b. Position plate (4) with eight bearing ball recesses (6) showing.
    c. Aline two screw holes (7) and "R" mark (8) with adjustment cover area (9).

GO TO NEXT PAGE

NOTE

Rod end connector (7) has left-hand threads.

39. ASSEMBLE ROD END CLEVIS (1) AND ADJUSTER (2).
    a. Install nut (3) on rod end connector (4).
    b. Install rod end connector (4) four turns into adjuster (2).
    c. Aline rod end connector (4) with clevis (1). Install pin (5) and new cotter pin (6).
    d. Install rod end connector (7) four turns into adjuster (2).



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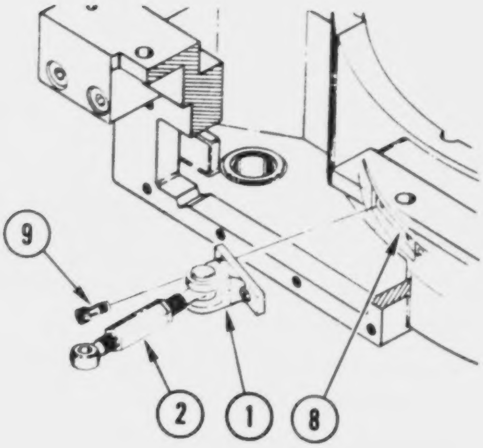
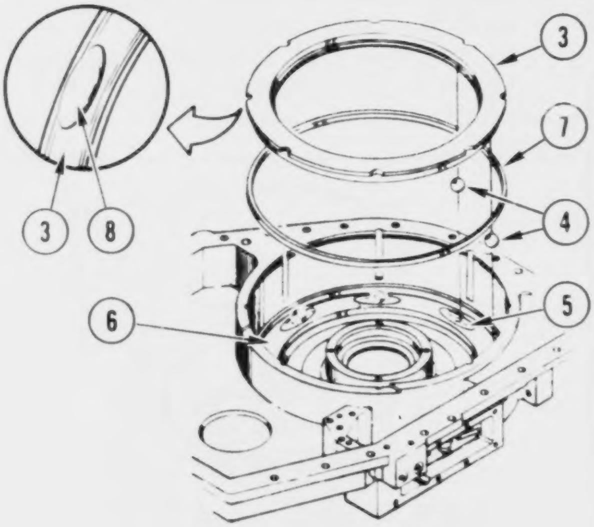
40. INSTALL CLEVIS (1) AND ADJUSTER (2).
    a. Place clevis (1) and adjuster (2) on plate (8).
    b. Coat threads of two screws (9) with sealant compound.
    c. Using 3/8-inch drive brace handle and 1/4-inch socket wrench attachment, install two screws (9).
41. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER, EXTENSION, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (9) TO 20-25 ft-lb (3 mkg).



42. (DELETED)



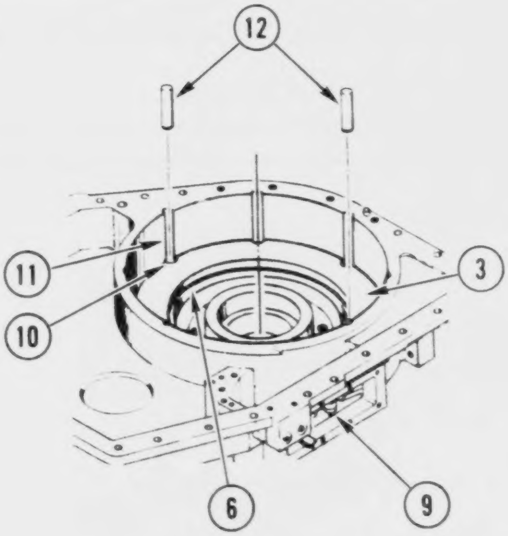
43. INSTALL INNER BRAKE ACTUATING PLATE (3).

a. Install eight bearing balls (4) in eight recesses (5) on plate (6).

b. Coat new special rubber seal (7) with transmission oil.

c. Install seal (7) on plate (3).

d. Install plate (3) with ball recesses (8) facing balls (4). Be sure plate is firmly seated on balls (4).



44. ALINE PLATE (3).

a. (H) Hold plate (3) down by hand.

b. Using clevis (9) as lever, move plate (6) until plate (3) is at lowest position.

c. Helper apply pressure to plates (6) and (3). Repairer aline slots (10) in plate (3) with eight slots (11) by moving clevis (9).

d. Install two pins (12) to hold plate (3) in place.

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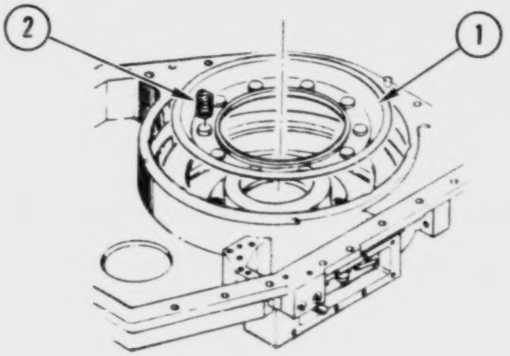
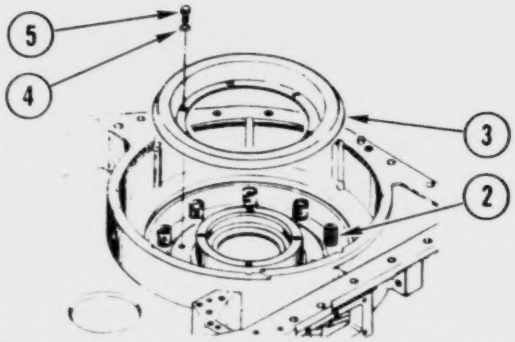


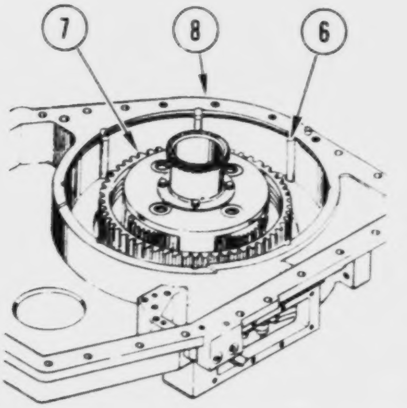
45. INSTALL SPRING RETAINER PLATE (1).

46. PLACE 10 SPRINGS (2) ON RETAINER (1).



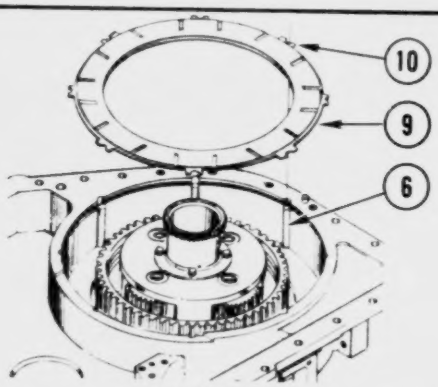
47. INSTALL INNER SPRING RETAINER (3).
    a. Aline retainer (3).
    b. (H) Hold retainer (3) down.
    c. Using 3/8-inch drive brace handle and 7/16-inch socket, install six washers (4) and screws (5). Tighten six screws two turns at a time to evenly compress springs (2).

48. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER, EXTENSION, AND 7/16-INCH SOCKET, TORQUE SIX SCREWS (5) TO 10-12 ft-lb (1-2 mkg).



49. INSTALL REMAINING SIX PINS (6).

50. PLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY (7) IN OUTPUT HOUSING (8).



CAUTION

Do not install brake plates without coating with transmission oil. Equipment can be damaged.

51. INSTALL STATIONARY SERVICE BRAKE PLATE (9).
    a. Coat plate (9) with transmission oil before assembly.
    b. Aline plate tabs (10) with pins (6).
    c. Install plate (9) so it is facing same way as removed.

CAUTION

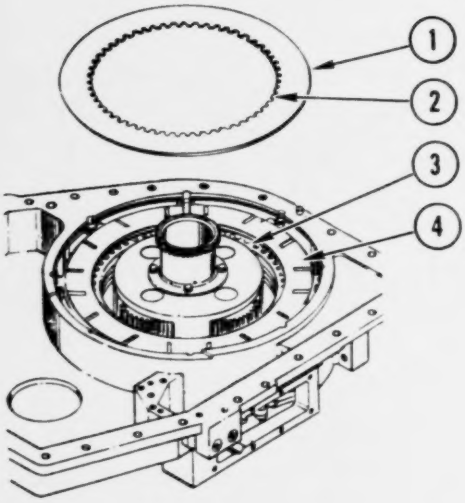
Do not install brake plates without coating with transmission oil. Equipment can be damaged.

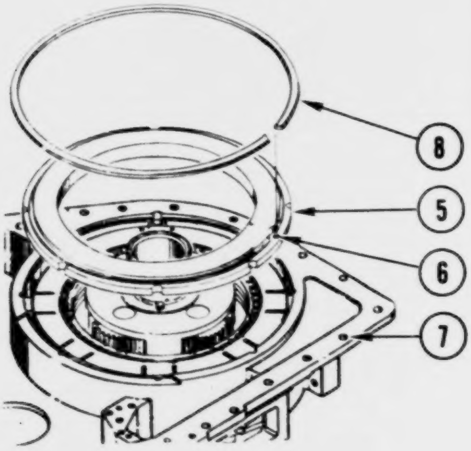
NOTE

Plates should be installed in the same order and facing same way as removed.

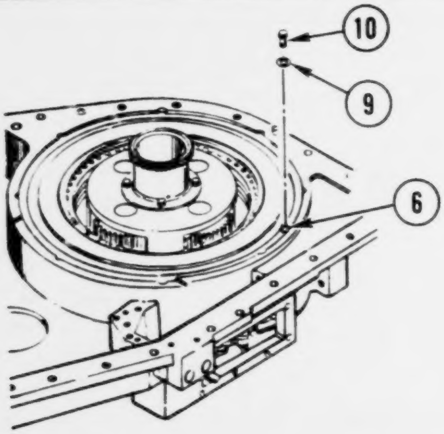
52. INSTALL ROTATING SERVICE BRAKE PLATE (1).
    a. Coat plate (1) with transmission oil before assembly.
    b. Aline plate splines (2) with splines on carrier assembly (3).
    c. Install plate (1) so it is facing the same way as removed.

53. REPEAT STEPS 51 AND 52 UNTIL 10 STATIONARY PLATES (4) AND 9 ROTATING PLATES (1) ARE INSTALLED.





54. INSTALL RETAINER PLATE (5).
    a. Install plate (5) with bolt hole (6) facing screw hole (7).
    b. Install retaining ring (8) with slot alined with hole (6).



55. INSTALL WASHER (9) AND BOLT (10).
    a. Coat threads of bolt (10) with sealant compound.
    b. Using 3/8-inch drive brace handle and 3/8-inch socket, install washer (9) and bolt (10) in hole (6).

56. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/8-INCH SOCKET, TORQUE BOLT (10) TO 60-75 in-lb (69-86 cmkg).

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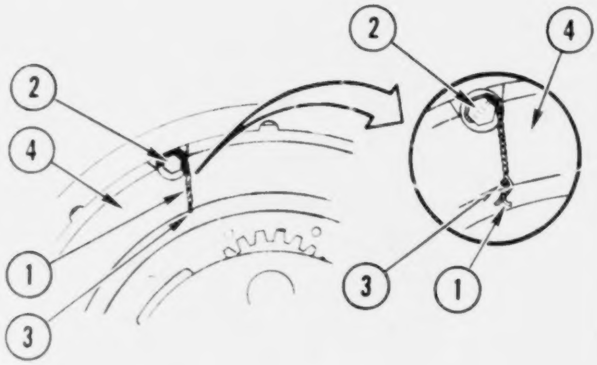
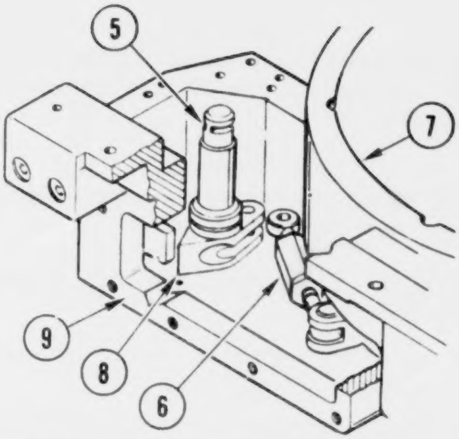


57. INSTALL LOCKWIRE (1).

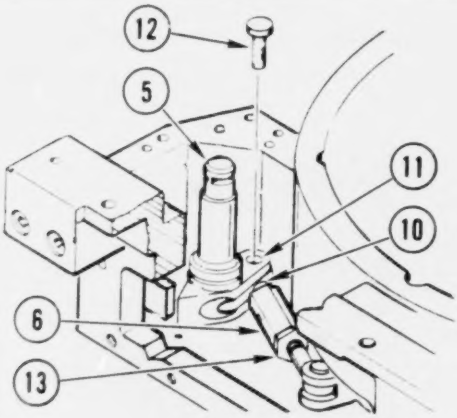
   a. Using wire-twister pliers, install lockwire (1) through bolt (2) and through hole (3) in plate (4).



58. INSTALL SHOULDERED SHAFT (5).

   a. Position adjuster (6) against housing (7).

   b. Insert shaft (5) into housing (7) so that pointer (8) is toward housing face (9).



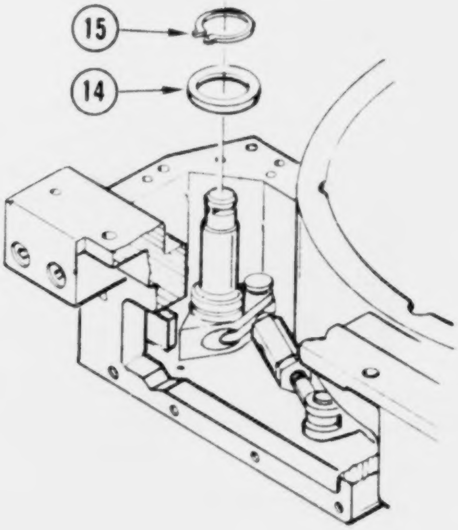
59. CONNECT SHAFT (5) TO ROD END CONNECTOR (10).

   a. Position rod end connector (10) under pin hole (11).

   b. Turn adjuster (6) to aline rod end connector (10) with hole (11).

   c. Insert pin (12) in hole (11).

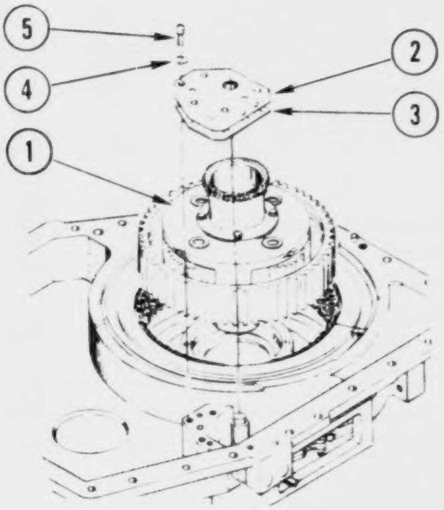
60. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 9/16-INCH CROWFOOT, TORQUE NUT (13) TO 17-20 ft-lb (2-3 mkg).



61. INSTALL SHIM (14).

62. INSTALL NEW RETAINING RING (15).

   a. Using retaining-ring pliers, install retaining ring (15).



63. REMOVE OUTPUT CARRIER ASSEMBLY (1).

64. INSTALL VALVE PLATE ASSEMBLY (2).
    a. Install new gasket (3).
    b. Position plate (2).
    c. Using 3/8-inch drive brace handle and 7/16-inch socket, install five washers (4) and screws (5).

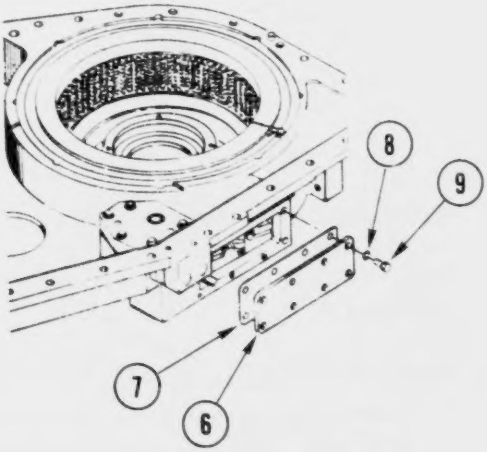
65. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER, EXTENSION, AND 7/16-INCH SOCKET, TORQUE FIVE SCREWS (5) TO 10-12 ft-lb (1-2 mkg).

---

66. INSTALL COVER (6).
    a. Install new gasket (7) and cover (6).
    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install eight new lock washers (8) and screws (9).

67. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (9) TO 75-100 in-lb (86-115 cmkg).

68. INSTALL RIGHT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-294.



END OF TASK

REPLACE RIGHT-HAND OUTPUT CARRIER ASSEMBLY

DESCRIPTION

This task covers Remove (page 4-294). Install (page 4-298).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Micrometer caliper set — (Item 52, App C)
- Micrometer depth gage — (Item 54, App C)
- Retaining-ring pliers — (Item 59, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)

Materials/Parts:

- Gasket
- Lock washer (8)
- Measuring plate (Item 7, App D)
- Shim Set
- Wood block (2) — (Item 2, App D)
- Wood block (2) — (Item 4, App D)

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

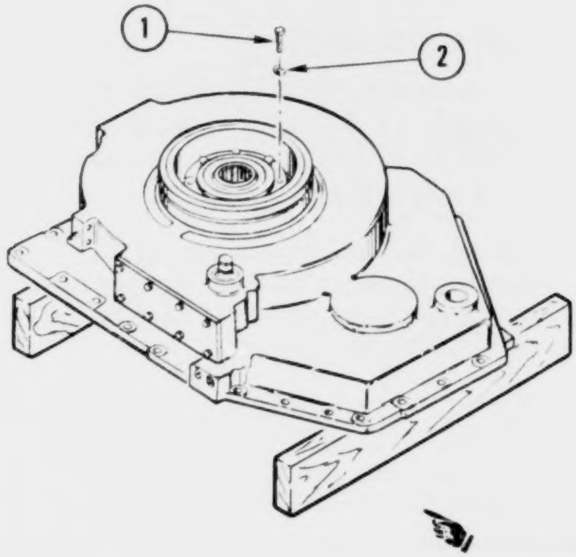
References:

- TM 9-214

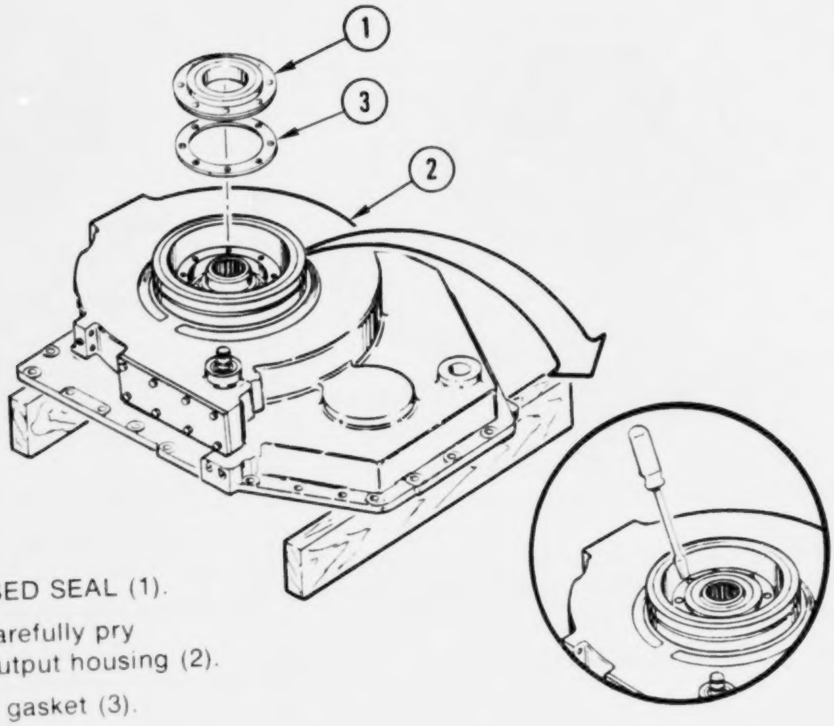
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE



1. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
2. REMOVE EIGHT SCREWS (1).
   a. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, remove eight screws (1) and lock washers (2). Discard lock washers.

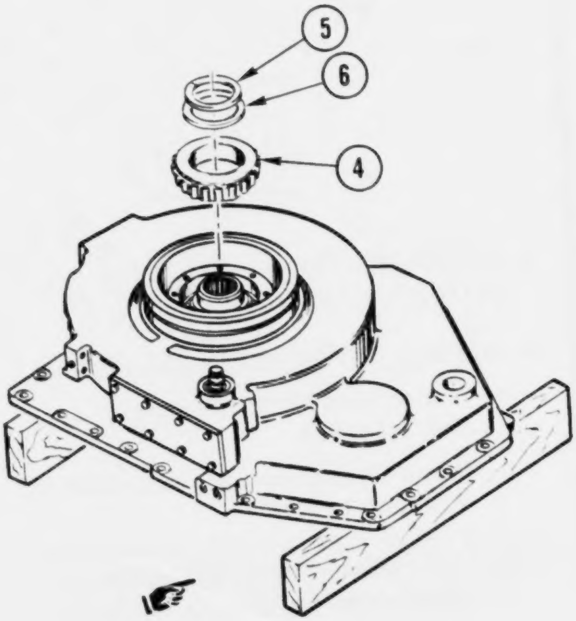


3. REMOVE PLAIN ENCASED SEAL (1).
   a. Using screwdriver, carefully pry seal (1) away from output housing (2).
   b. Remove seal (1) and gasket (3). Discard gasket.

WARNING
Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

CAUTION
Do not scratch carrier shaft surface when removing retaining ring. Equipment can be damaged.

4. REMOVE TAPERED CONE AND ROLLERS (4).
   a. Using retaining-ring pliers, remove retaining ring (5) and thrust washer (6). Discard thrust washer.
   b. Remove cone and rollers (4).



5. INSPECT CONE AND ROLLERS (4).
   a. Inspect cone and rollers (4) for damage. See TM 9-214.
   b. Replace cone and rollers (4) if damaged.

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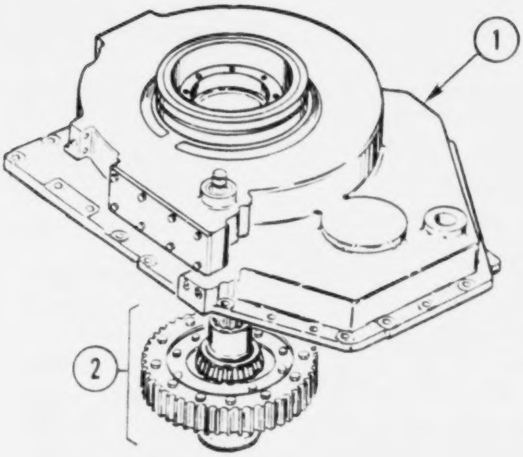
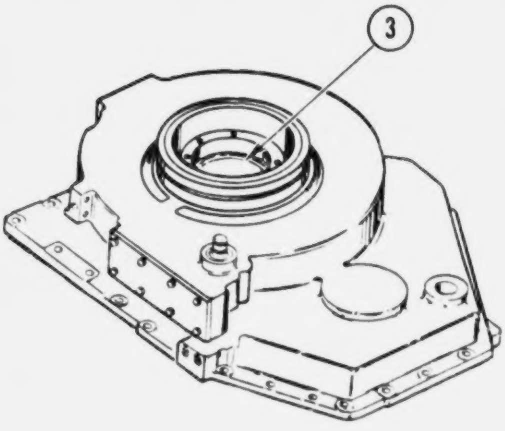
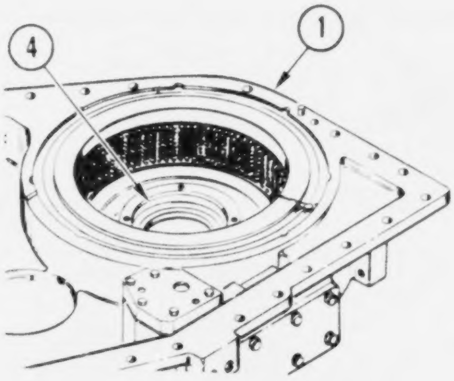


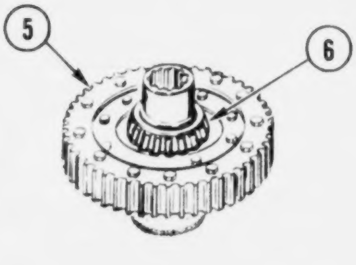
6. REPAIRER AND HELPER LIFT OUTPUT HOUSING (1) OFF OUTPUT CARRIER ASSEMBLY (2).



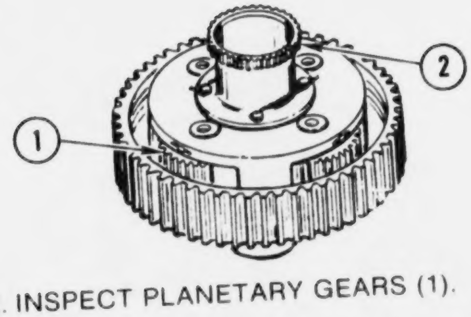
7. INSPECT TAPERED ROLLER CUP (3).
   a. Inspect cup (3) for damage. See TM 9-214.
   b. If cup (3) is damaged, go to step 10. If not, go to step 8.



8. REPAIRER AND HELPER TURN OUTPUT HOUSING (1) OVER.
9. INSPECT TAPERED ROLLER CUP (4).
   a. Inspect cup (4) for damage. See TM 9-214.
   b. If cup (4) is damaged, go to step 10. If not, go to step 11.
10. REPAIR RIGHT-HAND OUTPUT HOUSING, page 4-279.

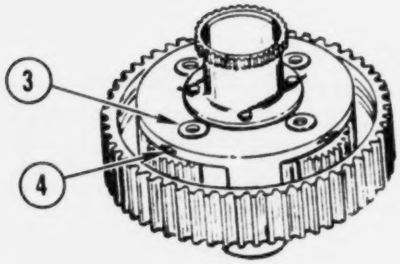


11. INSPECT SERVICE BRAKE HUB (5) AND TAPERED CONE AND ROLLERS (6).
   a. Inspect service brake hub (5) for damage. See page 2-5.
   b. Inspect cone and rollers (6) for damage. See TM 9-214.
   c. If damage is found, go to step 12. If not, go to step 13.



12. INSPECT PLANETARY GEARS (1).
    a. Inspect four gears (1) for damage. See page 2-5.
    b. If gears (1) are not damaged and rotate freely, go to step 13. If gears are damaged or do not move freely, go to step 15.

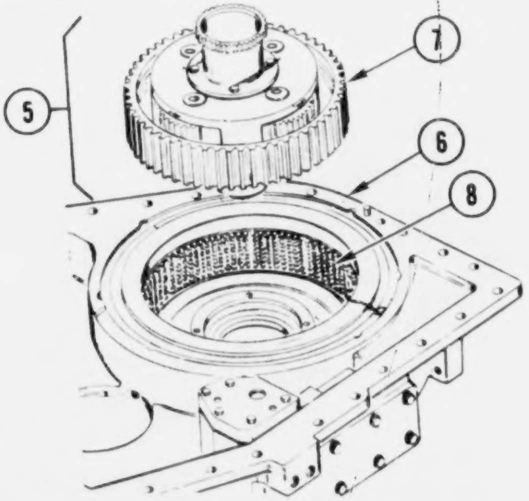
13. INSPECT SPUR GEAR (2) FOR DAMAGE. See page 2-5.
    a. If spur gear is damaged, go to step 15. If not, go to step 14.



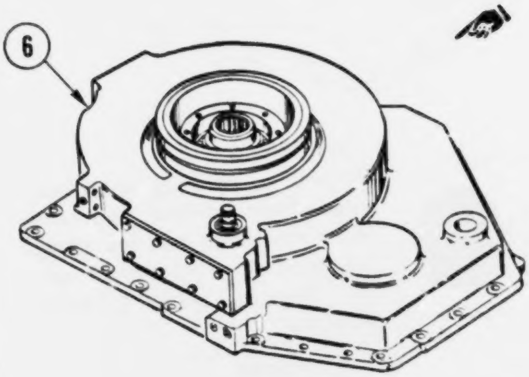
14. INSPECT PLANETARY GEAR SPINDLES (3) AND PINS (4).
    a. If all spindles (3) and pins (4) are tight, go to step 16. If not, go to step 15.

15. REPAIR RIGHT-HAND OUTPUT CARRIER ASSEMBLY, page 4-304.

INSTALL



16. INSTALL CARRIER ASSEMBLY (5) IN OUTPUT HOUSING (6).
    a. Repairer and helper position housing (6) with bottom side up.
    b. Aline gear teeth of hub (7) with brake plate teeth (8).
    c. Install carrier assembly (5) in housing (6).



17. REPAIRER AND HELPER TURN OUTPUT HOUSING (6) OVER WHILE HOLDING CARRIER ASSEMBLY IN PLACE.

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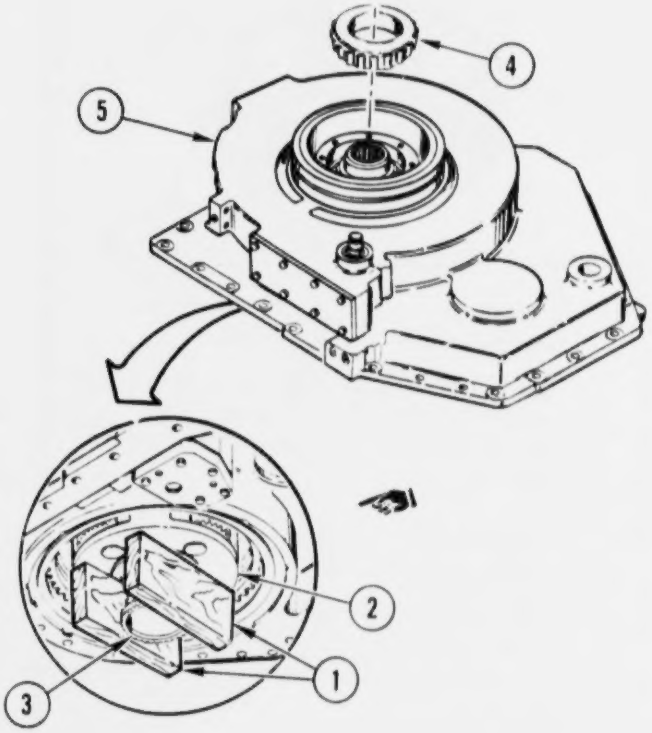
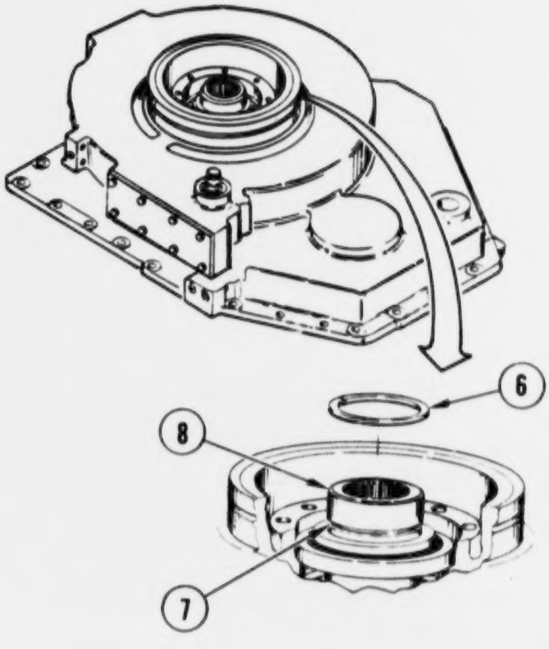


18. REPAIRER AND HELPER PLACE TWO WOOD BLOCKS (1) (ITEM 2) UNDER CARRIER ASSEMBLY (2) SO THAT SPUR GEAR (3) IS NOT TOUCHING.

19. INSTALL CONE AND ROLLERS (4).

20. (H) HOLD OUTPUT HOUSING (5) DURING STEPS 21 THROUGH 40 TO PREVENT HOUSING FROM TIPPING.



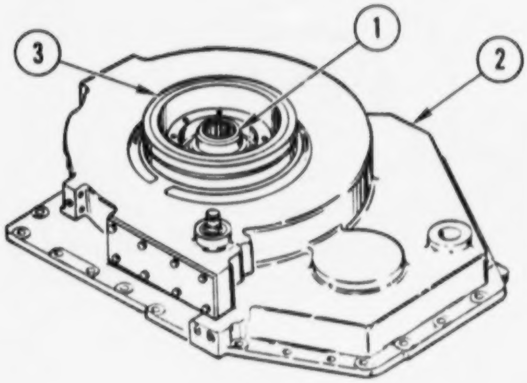
WARNING

Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

CAUTION

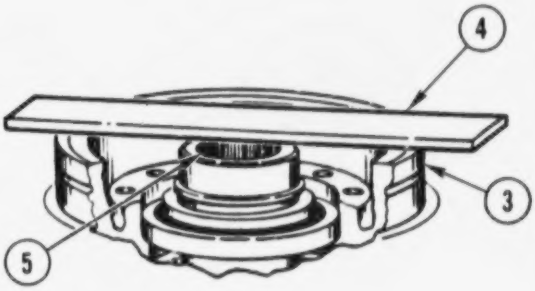
Do not scratch shaft surface when installing retaining ring. Equipment can be damaged.

21. USING RETAINING-RING PLIERS, INSTALL RETAINING RING (6) SHARP FACE UP IN GROOVE (7) ON CARRIER SHAFT (8).



22. SEAT CARRIER ASSEMBLY (1) IN HOUSING (2).

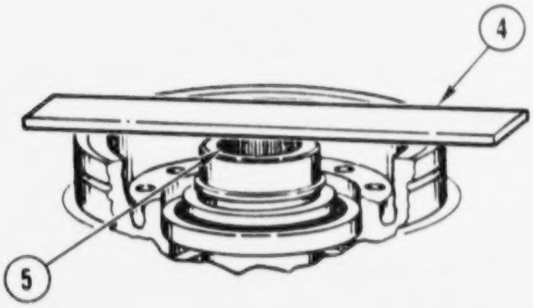
   a. Using plastic faced hammer, gently tap output housing collar (3) down to seat carrier assembly (1).



23. POSITION MEASURING PLATE (4) ACROSS OUTPUT HOUSING COLLAR (3).

   a. Place plate (4) across output collar (3).

   b. Position plate (4) to cover half of output carrier splined hole (5).



NOTE

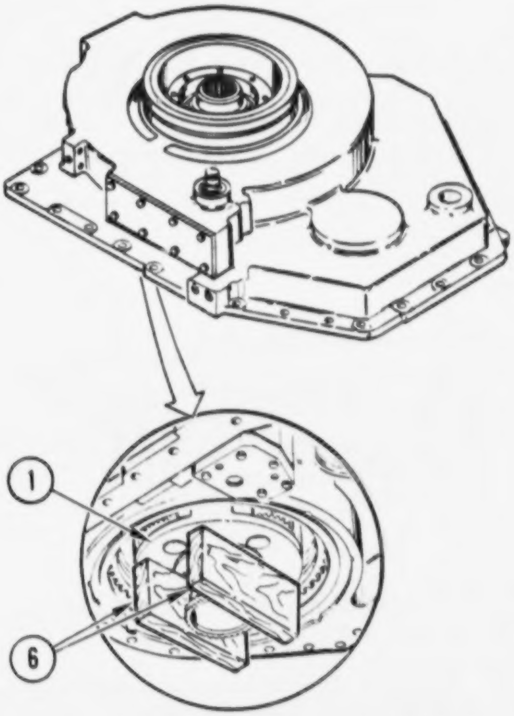
The object of these calculations is to find washer thickness needed to get correct end-play of carrier assembly in housing.

24. OBTAIN DIMENSION A.

   a. Using depth gage, measure distance from top of plate (4) to bottom of splined hole (5).

   b. Record results as dimension A.

   c. Remove plate (4).



25. REPAIRER AND HELPER REMOVE TWO WOOD BLOCKS (6) FROM UNDER CARRIER ASSEMBLY (1).

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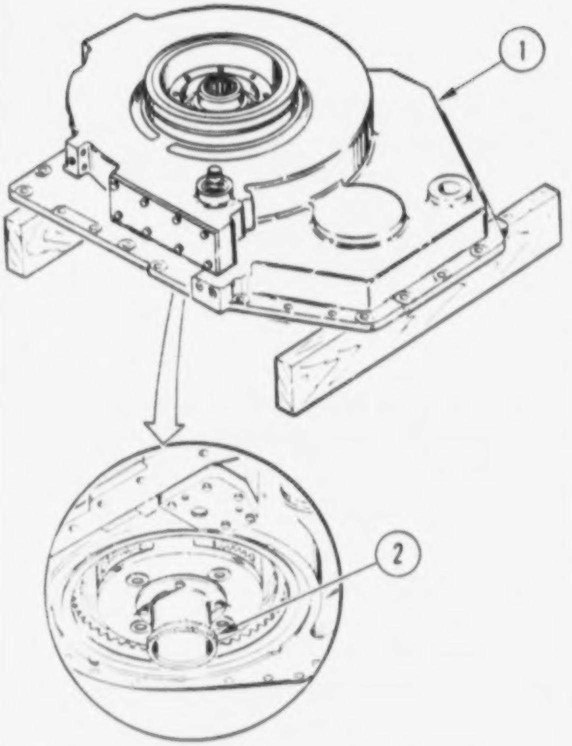
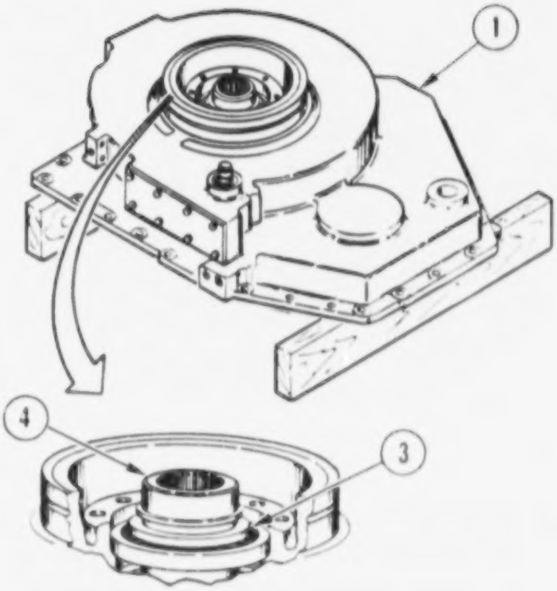
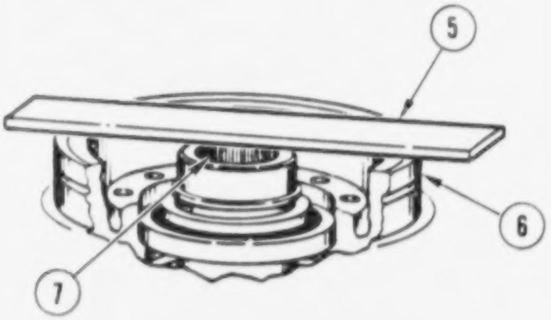


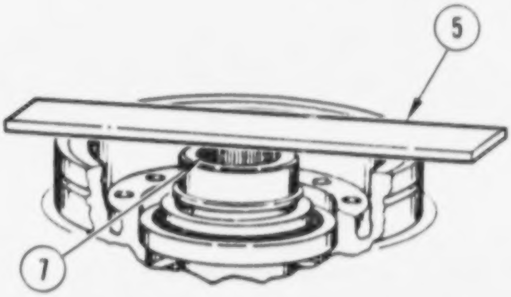
26. PLACE OUTPUT HOUSING (1) ON TWO WOOD BLOCKS (ITEM 4) SO THAT SPUR GEAR (2) IS NOT TOUCHING WORKBENCH.



27. SEAT CONE AND ROLLERS (3) IN HOUSING (1).
    a. Using plastic faced hammer, gently tap carrier assembly (4) down until cone and rollers (3) are fully seated.



28. POSITION MEASURING PLATE (5) ACROSS OUTPUT HOUSING COLLAR (6).
    a. Place plate (5) across output housing collar (6).
    b. Position plate (5) to cover half of output carrier splined hole (7).

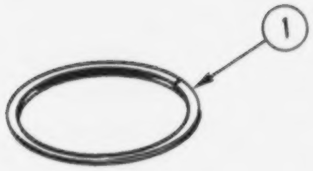


29. OBTAIN DIMENSION B.
    a. Using depth gage, measure distance from top of plate (5) to bottom of splined hole (7).
    b. Record results as dimension B.
    c. Remove plate.

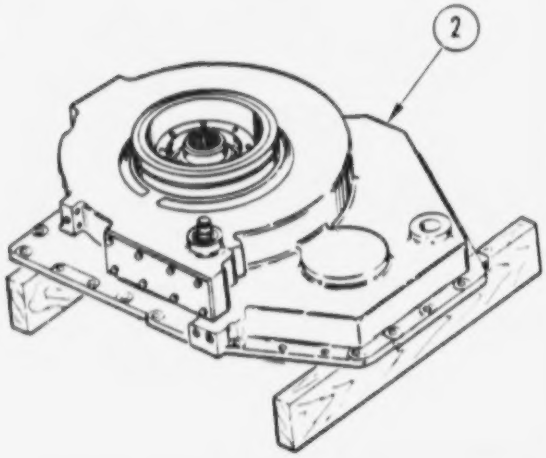
GO TO NEXT PAGE

STEP 29 DIMENSION B 0. ______ INCH
STEP 24 DIMENSION A −0. ______ INCH
STEP 30 DIMENSION C =0. ______ INCH

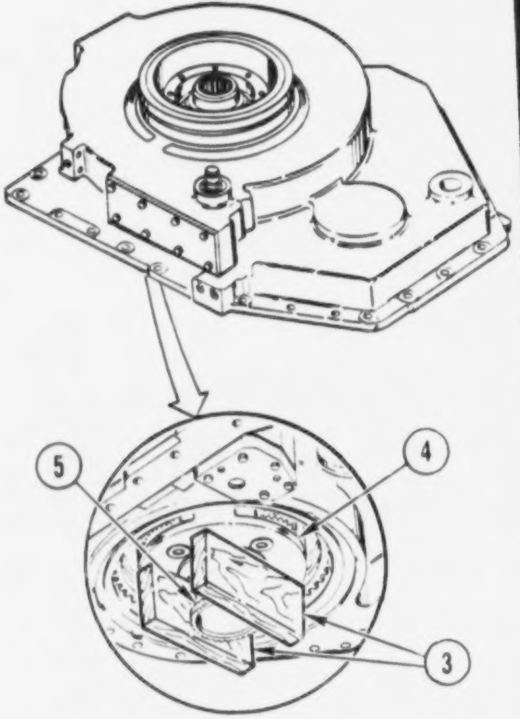
30. OBTAIN DIMENSION C.
    a. Subtract dimension A from dimension B.
    b. Record as dimension C.



31. SELECT NEW WASHER (1) FROM SHIM SET.
    a. Select one washer (1) from shim set that is 0.006 to 0.013 inch (0.15 to 0.33 mm) less than dimension C.



32. REMOVE TWO WOOD BLOCKS FROM UNDER HOUSING (2).



33. REPAIRER AND HELPER PLACE TWO WOOD BLOCKS (3) (ITEM 2) UNDER CARRIER ASSEMBLY (4) SO THAT SPUR GEAR (5) IS NOT TOUCHING WORKBENCH.

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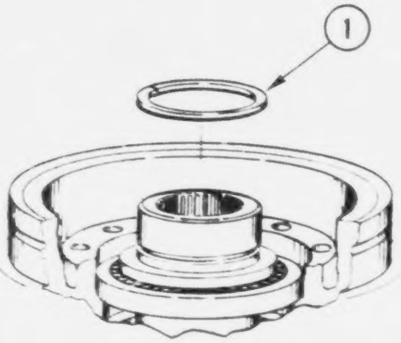
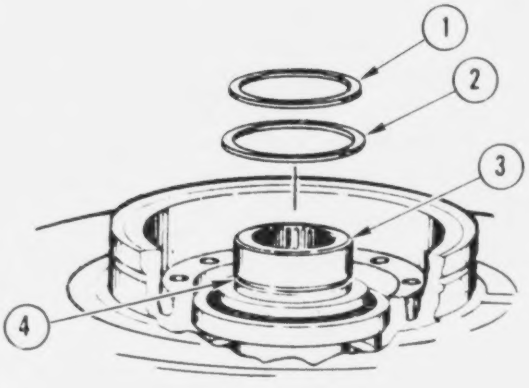


WARNING

Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

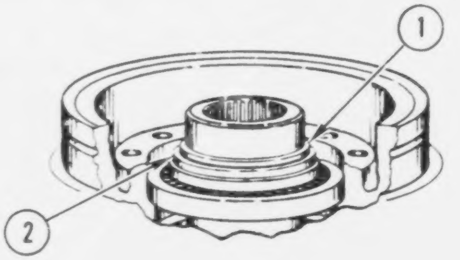
34. REMOVE RETAINING RING (1).
    a. Using retaining-ring pliers, remove retaining ring (1).



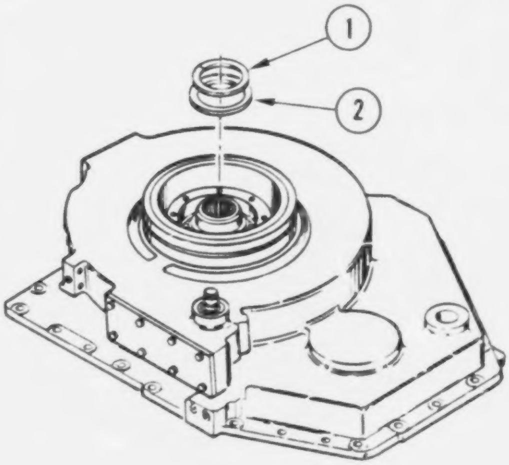
CAUTION

Do not scratch carrier shaft surface when installing retaining ring. Equipment can be damaged.

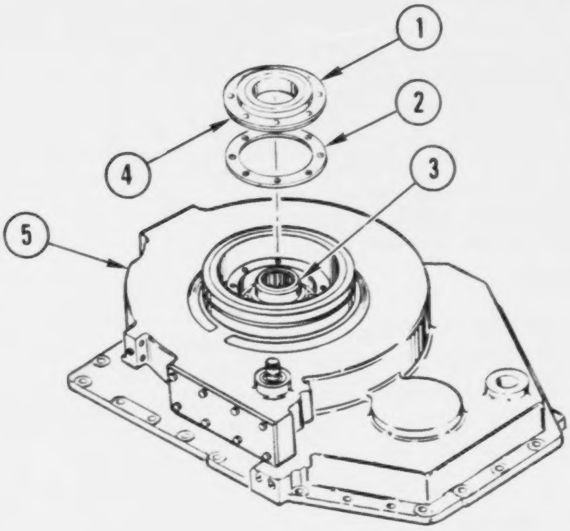
35. INSTALL NEW WASHER (2) AND RETAINING RING (1).
    a. Install washer (2) on shaft (3).
    b. Using retaining-ring pliers, install retaining ring (1) sharp-face up in groove (4) on shaft (3).



36. CHECK GAP BETWEEN WASHER (2) AND RETAINING RING (1).
    a. If gap is 0.006 to 0.013 inch (0.15 to 0.33 mm), go to step 38. If not, go to step 37.



37. REMOVE RETAINING RING (1) AND WASHER (2).
    a. Using retaining-ring pliers, remove retaining ring (1).
    b. Remove washer (2).
    c. Go to step 21.



38. INSTALL SEAL (1).
    a. Install new gasket (2).
    b. Install seal (1) on shaft (3) with beveled end (4) toward output housing (5).

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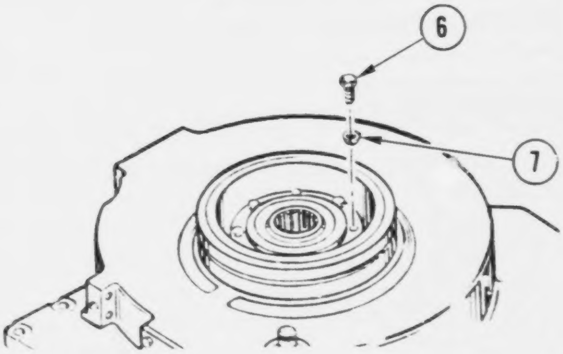
39. INSTALL EIGHT SCREWS (6).
    a. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, install eight new lock washers (7) and screws (6).



40. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (6) TO 75-100 in-lb (86-115 cmkg).

41. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

END OF TASK

REPAIR RIGHT-HAND OUTPUT CARRIER ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-304). Asemble (page 4-307).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App B)

Personnel Required:

Track Veh Rep 63H10

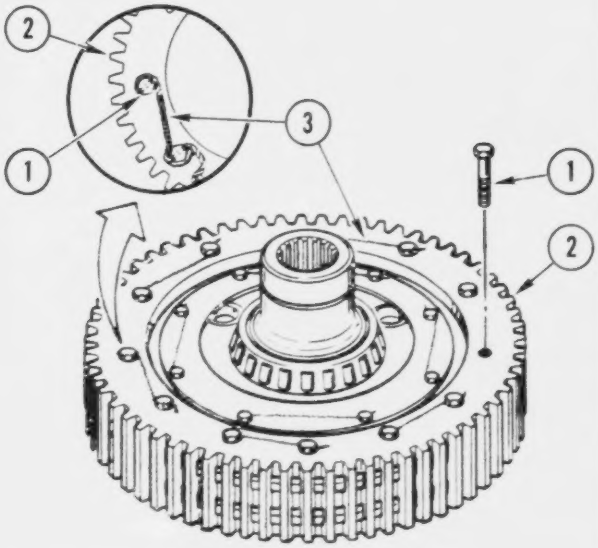
References:

TM 9-214

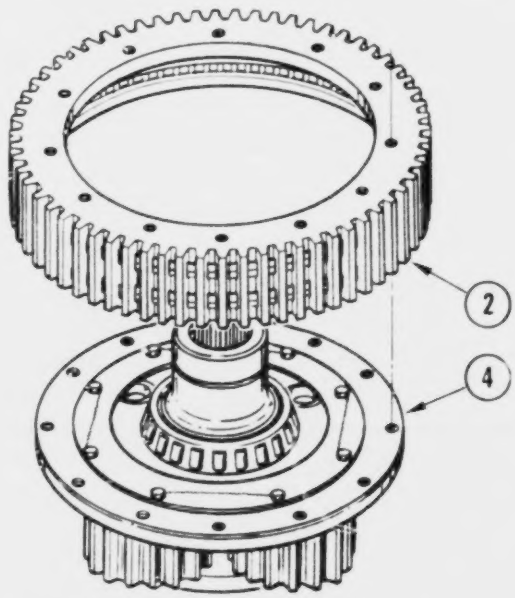
Equipment Conditions:

Right-hand output carrier assembly on workbench. See page 4-294.

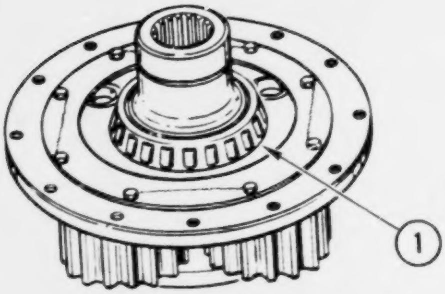
DISASSEMBLE



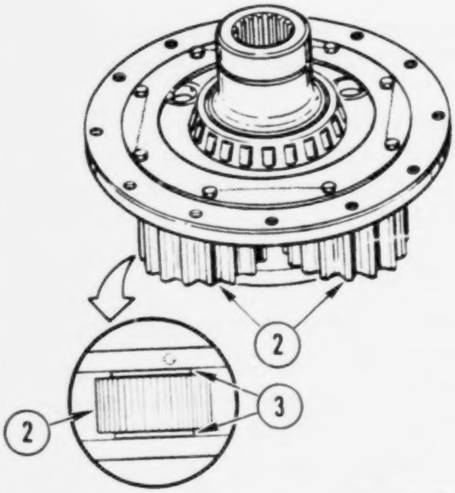
1. REMOVE 12 SCREWS (1) FROM SERVICE BRAKE HUB (2).
   a. Remove and discard lockwire (3) securing 12 screws (1).
   b. Remove 12 screws (1) from hub (2).



2. REMOVE HUB (2) FROM OUTPUT CARRIER (4).
3. INSPECT HUB (2) FOR DAMAGE. See page 2-5.
   a. Replace hub (2) if damaged.

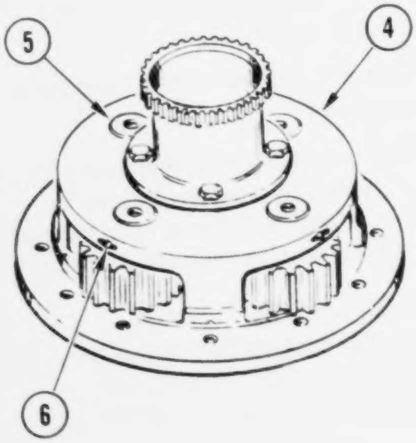


4. INSPECT TAPERED CONE AND ROLLERS (1).
   a. Inspect cone and rollers (1) for damage. See TM 9-214.
   b. If cone and rollers (1) are damaged, go to step 9. If not, go to step 5.



5. INSPECT FOUR SPUR GEARS (2).
   a. Inspect four gears (2) for damage. See page 2-5.
   b. If gears (2) are not damaged and rotate freely, go to step 6. If gears are damaged, or do not rotate freely, go to step 9.

6. CHECK END PLAY OF GEARS (2).
   a. If end play between thrust washers (3) and gears (2) is less than .060 inch (1.52 mm), go to step 7. If not, go to step 9.



7. TURN OUTPUT CARRIER (4) OVER.

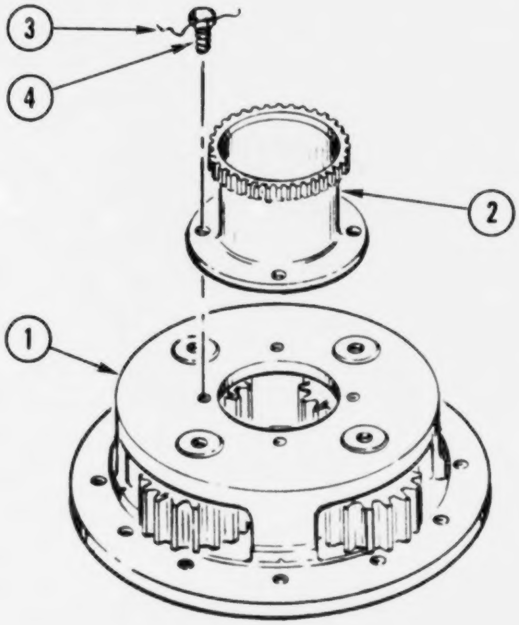
8. INSPECT PLANETARY GEAR SPINDLES (5) AND PINS (6).
   a. If all spindles (5) and pins (6) are tight, go to step 14. If not, go to step 10.

GO TO NEXT PAGE

9. TURN RIGHT-HAND OUTPUT CARRIER ASSEMBLY (1) OVER.

10. IF SPUR GEAR (2) WAS NOT REMOVED, GO TO STEP 11. IF SPUR GEAR WAS REMOVED, GO TO STEP 12.

11. REMOVE SPUR GEAR (2).
    a. Remove and discard lockwire (3).
    b. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, remove four screws (4).
    c. Remove gear (2).



12. REPLACE OUTPUT CARRIER ASSEMBLY. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE CARRIER ASSEMBLY TO DEPOT.

13. EFFORT IS COMPLETE. GO TO END OF TASK.

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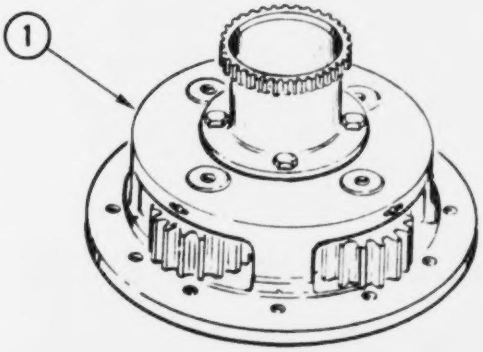
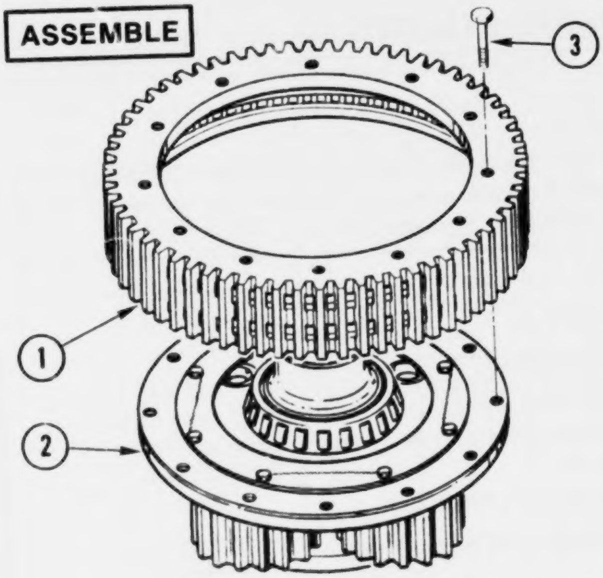
14. CLEAN RIGHT-HAND OUTPUT CARRIER ASSEMBLY (1).
    a. Clean assembly and hardware. See page 2-2.

15. INSPECT RIGHT-HAND OUTPUT CARRIER ASSEMBLY (1).
    a. Inspect assembly and hardware. See page 2-5.
    b. Replace output carrier assembly (1) if damaged. Record failure on DA FORM 2407 and return defective output carrier assembly to depot.



16. IF RIGHT-HAND OUTPUT CARRIER ASSEMBLY (1) WAS REPLACED, GO TO END OF TASK. IF NOT, GO TO STEP 17.

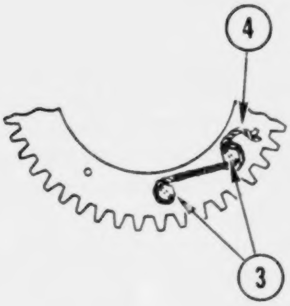
ASSEMBLE



17. INSTALL HUB (1) ON CARRIER (2).

18. INSTALL 12 SCREWS (3) IN HUB (1).
    a. Coat threads of 12 screws (3) with sealant compound.
    b. Install 12 screws (3) in hub (1).

19. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 12 SCREWS (3) TO 20-25 ft-lb (3 mkg).



20. INSTALL LOCKWIRE (4).
    a. Using wire-twister pliers, install lockwire (4) through 2 screws (3). Repeat for remaining 10 screws.

END OF TASK

REPAIR RIGHT-HAND OUTPUT HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the right-hand output housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Socket wrench set — (Item 89, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11,App B)
- Transmission oil — (Item 12, App B)

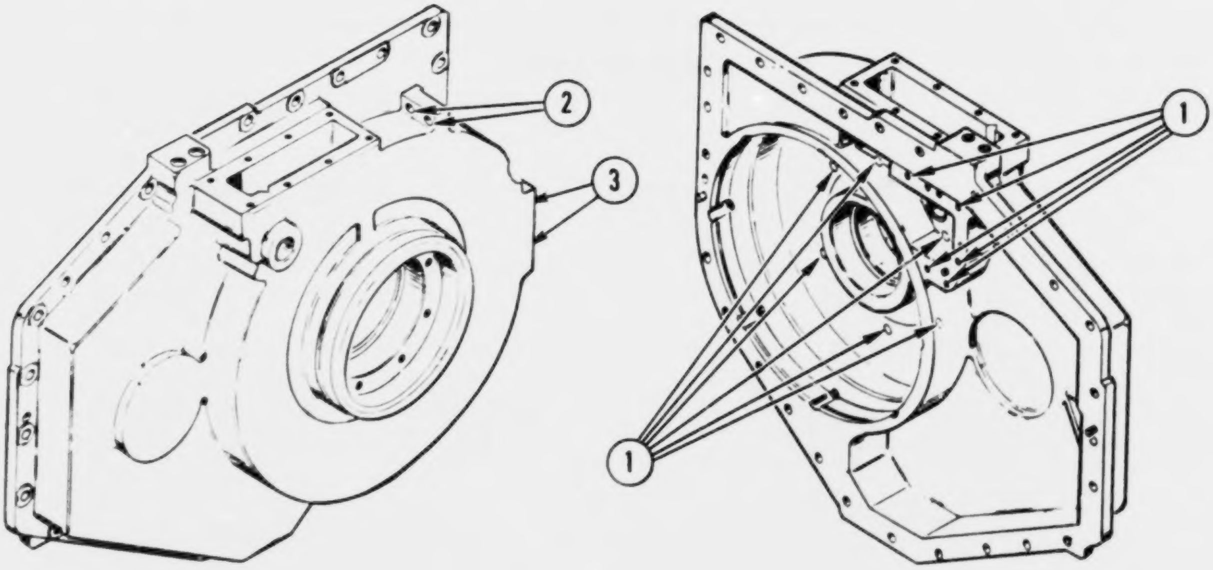
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Right-hand output housing on workbench. See page 4-279.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD / OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counterbore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-13L SR258L	SR25R		SR25T	RZA12788-2 RZA12656-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
	M45932/3-13L SRW258L	SRW25R	SRW25D	SRW25T	RZA12789-2 RZA12791-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
2	M45932/1-23L SR376L	SR37R		SR37T	RZA12788-4 RZA12656-4	.128-.138 in. (3.25-3.51 mm)	SR37WA	.035-.045 in. (.889-1.14 mm)
	M45932/3-23L SRW376L	SRW37R	SRW37D	SRW37T	RZA12789-4 RZA12791-4	.128-.138 in. (3.25-3.51mm)	SR37WA	.035-.045 in. (.889-1.14 mm)
3	M45932/1-31L SR503L	SR50R		SR50T	RZA12788-6 RZA12656-6	.138-.148 in. (3.51-3.76mm)	SR50WA	.045-.055 in. (1.14-1.4 mm)
	M45932/3-31L SRW503L	SRW50R	SRW50D	SRW50T	RZA12789-6 RZA12791-6	.138-.148 in. (3.51-3.76 mm)	SR50WA	.045-.055 in. (1.14-1.4 mm)

END OF TASK

REPAIR RIGHT-HAND BRAKE ACTUATING PLATE INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the right-hand brake actuating plate. Part or item numbers of tools, kits, and inserts, and working dimensions are given below.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Honing stone — (Item 4B, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

Personnel Required:

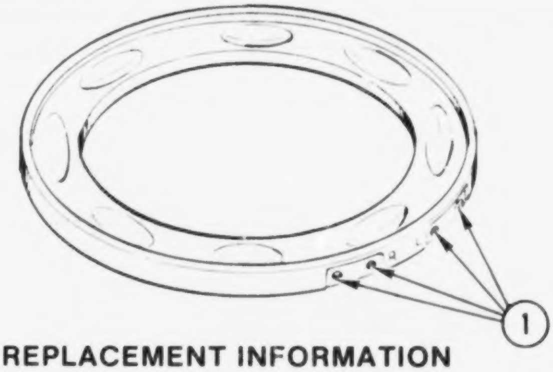
Track Veh Rep 63H10

Equipment Conditions:

Brake actuating plate on workbench. See page 4-279.

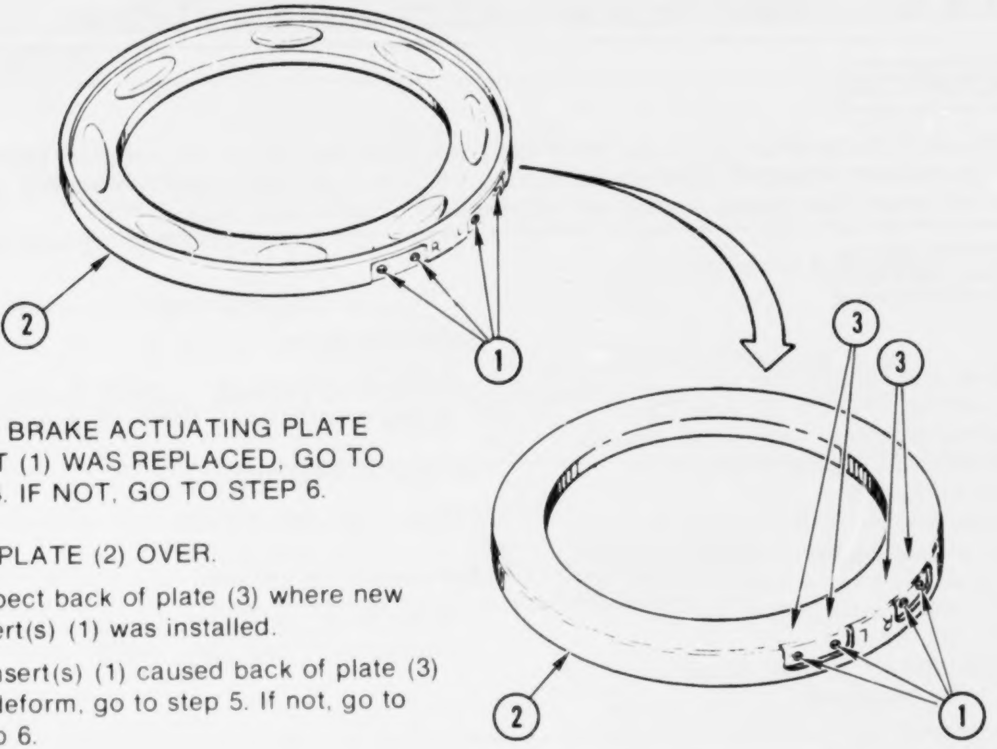
REPAIR

1. INSPECT INSERTS (1). See page 2-5.
2. IF ANY INSERT (1) IS DAMAGED, SEE REPLACE INSERTS, page 2-171. SEE CHART FOR REPLACEMENT INFORMATION.



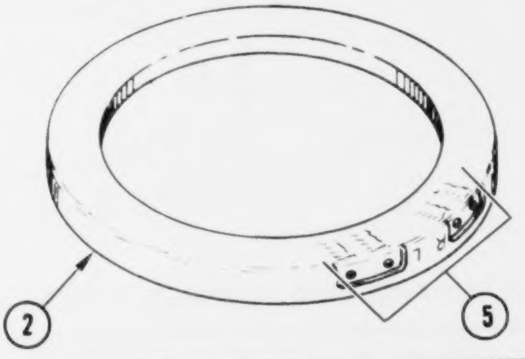
STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No	Insert No STANDARD OVERSIZE	Removal Tool No	Step Drill No	Thread Cutting Tap Tool No	Swage Tool No. With Swage Tool Stop No	Counterbore Depth	Drive Wrench No	Installation Depth Below Surface
1	M45932/1-17L SR314L	SR31R		SR31T	RZA12788-3 RZA12656-3	.097-.107 in (2.46-2.72 mm)	SR31WA	.035-.045 in. (.889-1.14 mm)
	M45932/3-17L SRW314L	SRW31R	SRW31D	SRW31T	RZA12789-3 RZA12791-3	.097-.107 in (2.46-2.72 mm)	SR31WA	.035-.045 in. (.889-1.14 mm)



3. IF ANY BRAKE ACTUATING PLATE INSERT (1) WAS REPLACED, GO TO STEP 4. IF NOT, GO TO STEP 6.

4. TURN PLATE (2) OVER.
   a. Inspect back of plate (3) where new insert(s) (1) was installed.
   b. If insert(s) (1) caused back of plate (3) to deform, go to step 5. If not, go to step 6.



5. HONE RAISED AREA (5) OF PLATE (2).
   a. Using fine honing stone, hone raised area(s) (5) on bottom of plate (2) until surface is flat.

6. CLEAN ALL INSERTS AND RELATED HOUSINGS.
   a. Clean assembly and hardware. See page 2-2.

END OF TASK

REPAIR RIGHT-HAND RETAINER PLATE ASSEMBLY INSERT

DESCRIPTION

This task gives the location and size of the insert used in the right-hand retainer plate assembly. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

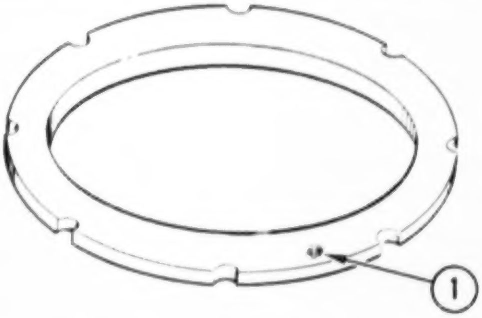
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Right-hand retainer plate assembly on workbench. See page 4-279.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD / OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installa-tion Depth Below Surface
1	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)

END OF TASK

Section IX. LEFT-HAND OUTPUT HOUSING

TASK INDEX

Task	Page
Replace Left-Hand Output Housing	4-314
Repair Left-Hand Output Housing	4-323
Replace Left-Hand Output Carrier Assembly	4-336
Repair Left-Hand Output Carrier Assembly	4-345
Repair Left-Hand Output Housing Inserts	4-348
Repair Left-Hand Brake Actuating Plate Inserts	4-350
Repair Left-Hand Retainer Plate Assembly Insert	4-352

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv .

REPLACE LEFT-HAND OUTPUT HOUSING

DESCRIPTION

This task covers: Remove (page 4-314). Install (page 4-319).

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- Crowfoot attachment — (Item 21, App C)
- Fixture removal assembly — (Item 29, App C)
- Flat washer — (Item 30, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Hex-head cap screw — (Item 36, App C)
- Lever arm — (Item 43, App C)
- Output housing installer — (Item 57, App C)
- Self-locking nut — (Item 67, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

- Cleaning Solvent — (Item 1, App B)
- Petrolatum — (Item 7, App B)
- Wiping rag — (Item 13, App B)
- Wood blocks (2) — (Item 4, App D)
- Gasket
- Gasket
- Lock washer (10)
- Lock washer (28)

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

Equipment Conditions:

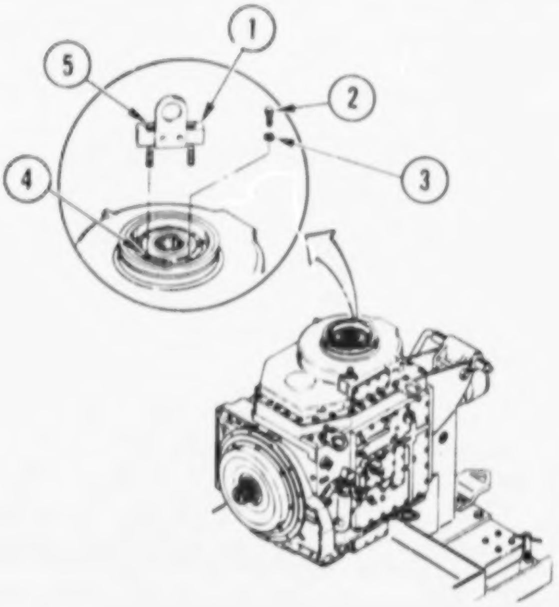
Transmission mounted on tip-over stand. See page 2-144.

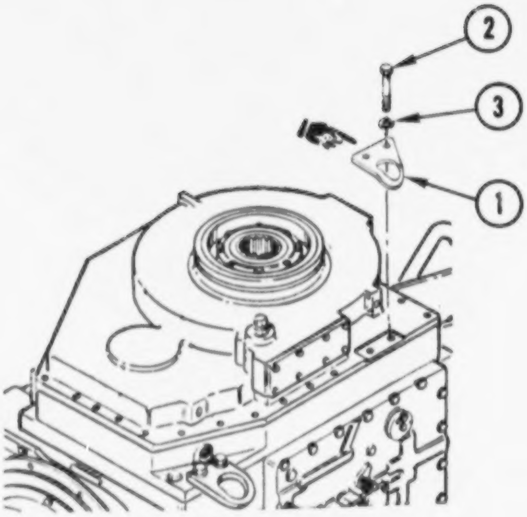
REMOVE

WARNING

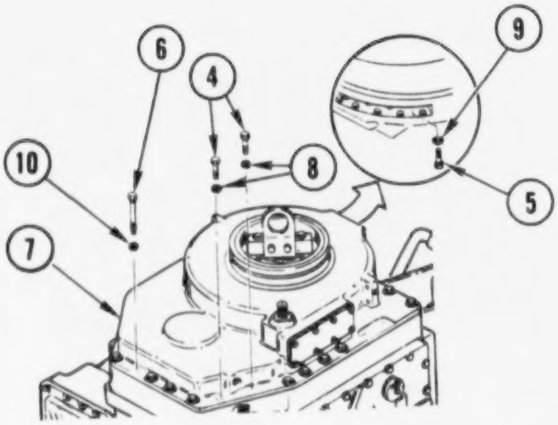
Fixture removal assembly must be installed in position shown. Output housing is heavy. Improper installation of removal assembly can cause an uneven lift and injury to personnel.

1. INSTALL FIXTURE REMOVAL ASSEMBLY (1).
   a. Remove two screws (2) and lock washers (3).
   b. Put removal assembly (1) on output carrier (4).
   c. Tighten two screws (5).





2. REMOVE LIFTING EYE (1).
   a. Remove two screws (2) and lock washers (3). Discard lock washers.
   b. Remove eye (1).



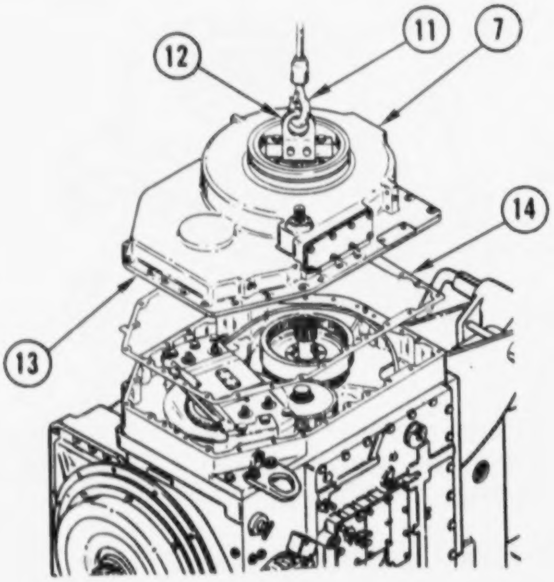
3. REMOVE SCREWS (4), (5) AND (6) FROM LEFT-HAND OUTPUT HOUSING (7).
   a. Remove two screws (4) and lock washers (8). Discard lock washers.
   b. Remove five screws (5) and lock washers (9). Discard lock washers.
   c. Remove 19 screws (6) and lock washers (10). Discard lock washers.

4. ATTACH LIFTING DEVICE (11) TO REMOVAL ASSEMBLY (12).

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

5. REMOVE OUTPUT HOUSING (7).
   a. Loosen output housing (7) using pry point (13).
   b. Evenly lift output housing (7). Remove and discard gasket (14).
   c. Lower output housing (7) onto work surface.



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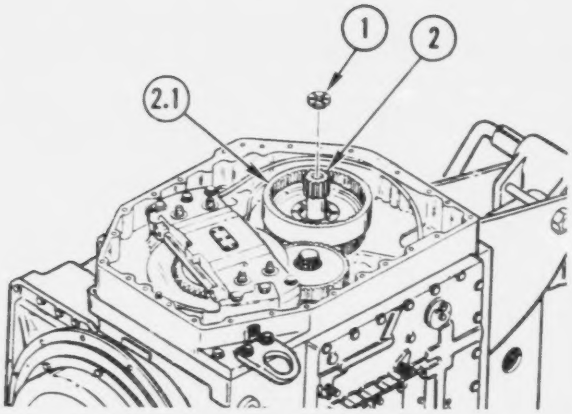
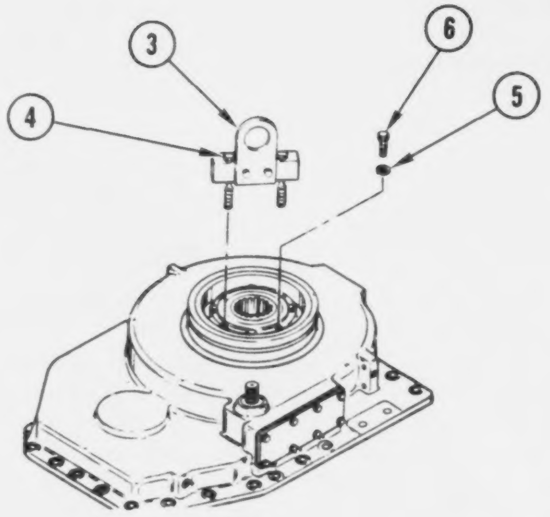


NOTE
Thrust washer can be in carrier.

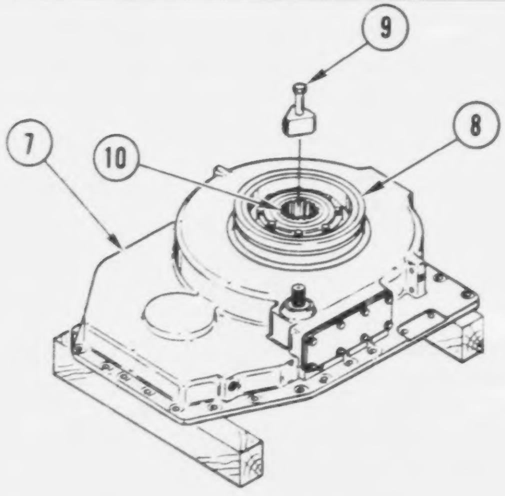
6. REMOVE THRUST WASHER (1) FROM SPUR GEARSHAFT (2).

7. INSPECT THRUST WASHER (1) FOR DAMAGE. See page 2-5.
   a. Replace thrust washer (1) if damaged.

7.1 REMOVE SPUR GEAR (2.1).

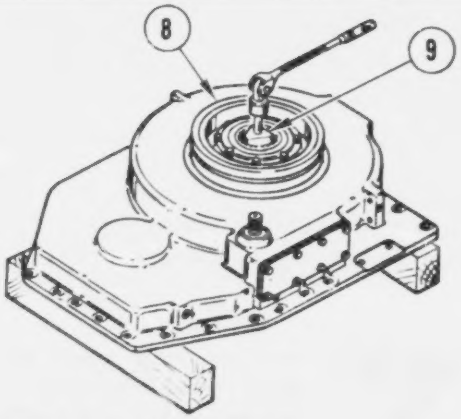


8. REMOVE REMOVAL ASSEMBLY (3).
   a. Unscrew two screws (4) and remove removal assembly (3).
   b. Install two lock washers (5) and screws (6).



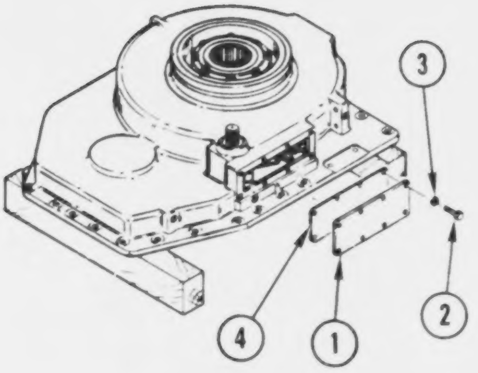
9. PLACE OUTPUT HOUSING (7) ON TWO WOOD BLOCKS SO THAT CARRIER (8) IS FREE TO ROTATE.

10. INSTALL OUTPUT HOUSING INSTALLER (9) INTO SPLINED OUTPUT SHAFT (10).



11. USING 3/8-INCH DRIVE HINGED HANDLE AND 3/4-INCH SOCKET, ROTATE CARRIER (8).
    a. If carrier (8) cannot be rotated, remove output housing installer (9) and go to step 12. If carrier can be rotated, remove output housing installer and go to step 13.

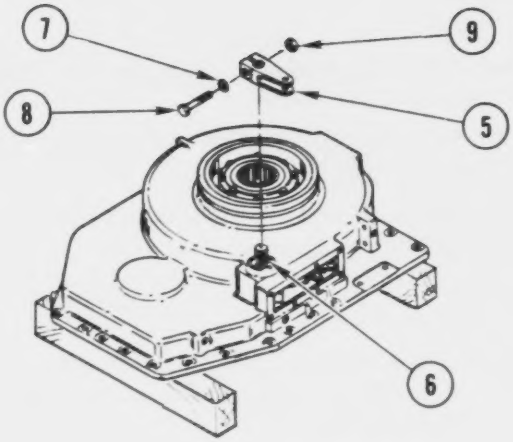
12. REPAIR LEFT-HAND OUTPUT HOUSING, page 4-323.



13. REMOVE ACCESS COVER (1), IF INSTALLED.

   a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove eight screws (2) and lock washers (3). Discard lock washers.

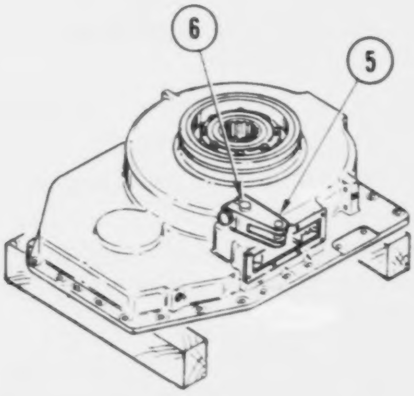
   b. Remove cover (1) and gasket (4). Discard gasket.



14. ATTACH LEVER ARM (5) TO SHOULDERED SHAFT (6).

   a. Position lever arm (5).

   b. Install washer (7), screw (8), and self-locking nut (9).



15. ROTATE LEVER ARM (5) AND APPLY FIRM PRESSURE TO ACTUATE BRAKES.

   a. If shaft (6) does not rotate, go to step 20. If shaft does rotate, go to step 17.

16. (DELETED)

GO TO NEXT PAGE

NOTE

Two different alinement indicators are used in the output assemblies.

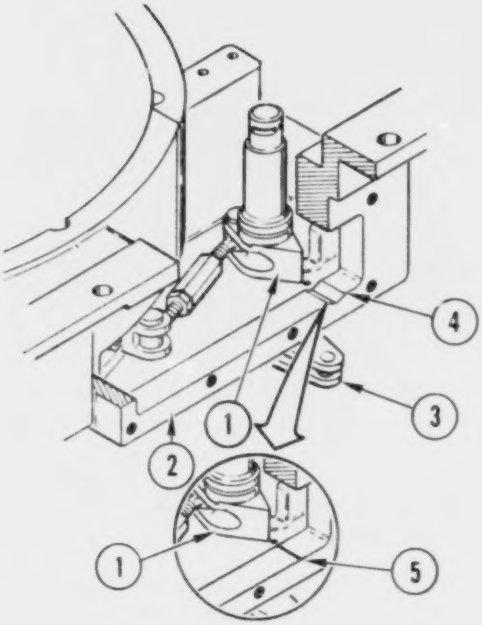
17. CHECK ALINEMENT OF SHOULDERED SHAFT POINTER (1).

    a. Repairer and helper turn left-hand output housing (2) over.

    b. Rotate lever arm (3) and apply firm pressure.

    c. Check that pointer (1) alines with v-groove indicator (4) or scribe mark indicator (5).

    d. If pointer (1) does not aline with indicator (4) or (5), go to step 18. If pointer does aline with indicator, go to step 19.



NOTE

Two different alinement indicators are used in the output assemblies.

This procedure contains only a coarse pointer adjustment. The fine pointer adjustment is done in the vehicle.

18 ADJUST POINTER (1).

    a. Release lever arm (3). Loosen jam nut (6).

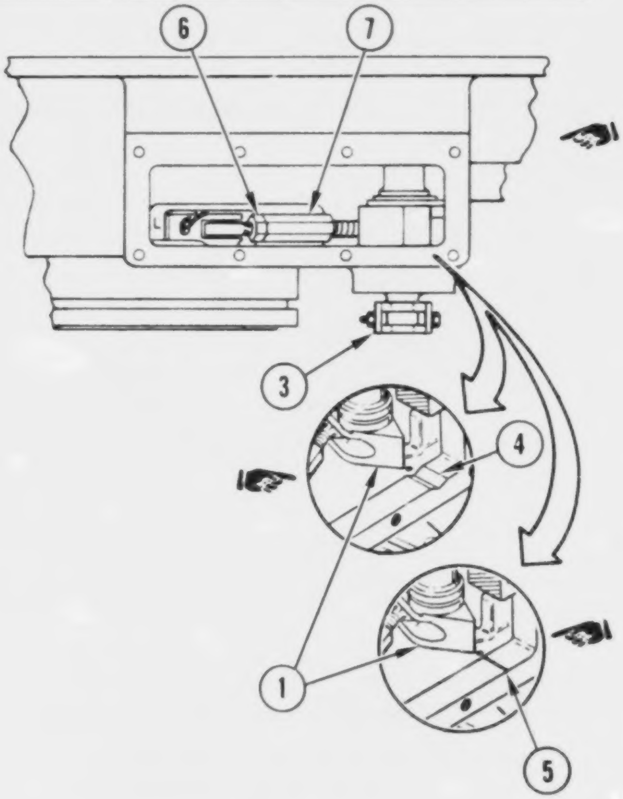
    b. Adjust pointer (1) by rotating adjuster nut (7). Tighten jam nut (6).

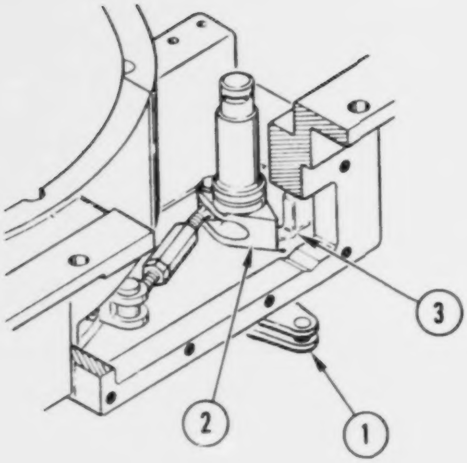
    c. Rotate lever arm (3) and apply firm pressure.

    d. Check that pointer (1) alines with v-groove indicator (4) or scribe mark indicator (5).

    e. If pointer (1) does aline, go to step 18.1. If after repeated adjustments pointer (1) will not aline, go to step 20.

18.1 USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 9/16-INCH CROWFOOT, TORQUE NUT (6) TO 17-20 ft-lb (2-3 mkg).

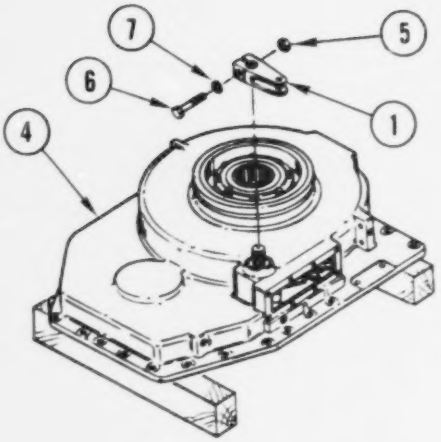




19. RELEASE LEVER ARM (1).

   a. If pointer (2) does not rest against stop (3), go to step 20. If pointer does rest against stop, go to step 21.

20. REPAIR LEFT-HAND OUTPUT HOUSING, page 4-323.



20.1 IF REPAIR LEFT-HAND OUTPUT HOUSING TASK WAS PERFORMED, GO TO STEP 13. IF NOT, GO TO STEP 21.

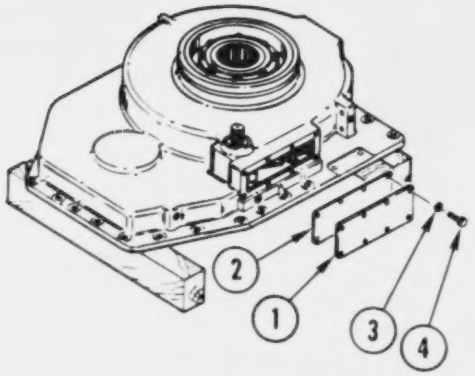
21. REMOVE LEVER ARM (1).

   a. Repairer and helper turn output housing (4) over.

   b. Remove self-locking nut (5), screw (6), and washer (7).

   c. Remove lever arm (1).

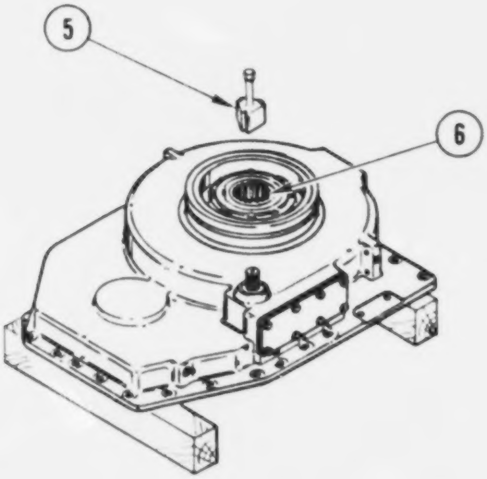
INSTALL



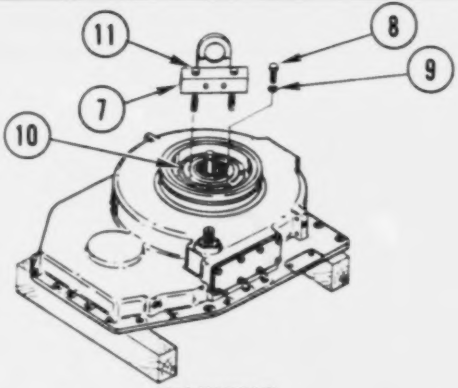
22. (DELETED)

23. INSTALL COVER (1) IF REMOVED.
    a. Install new gasket (2) and cover (1).
    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install eight new lock washers (3) and screws (4).

24. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (4) TO 75-85 in-lb (86-98 cmkg).



25. INSTALL OUTPUT HOUSING INSTALLER (5).
    a. Aline splines on installer (5) with splines in carrier (6).
    b. Install installer (5).



WARNING

Fixture removal assembly must be installed in position shown. Output housing is heavy. Improper installation of removal assembly can cause an uneven lift and injury to personnel.

26. INSTALL REMOVAL ASSEMBLY (7).
    a. Remove two screws (8) and lock washers (9). Discard lock washers.
    b. Put removal assembly (7) on output carrier (10).
    c. Tighten two screws (11).

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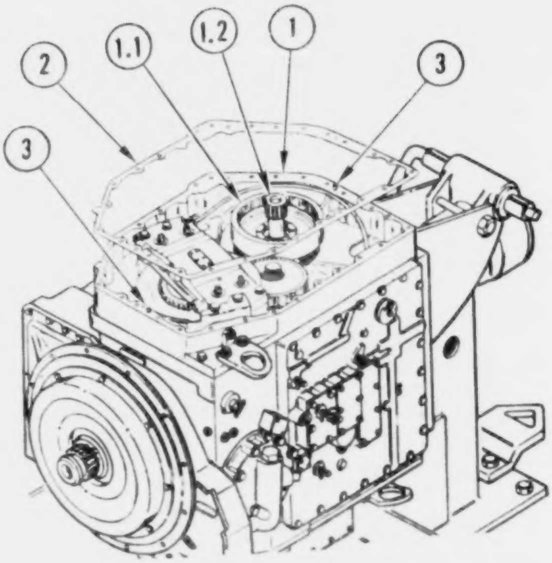


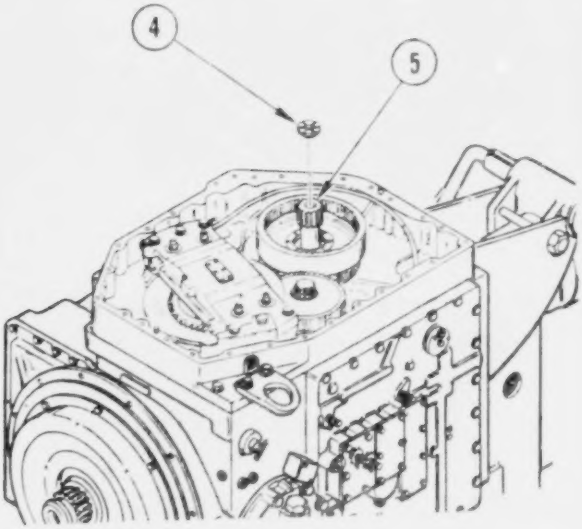
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

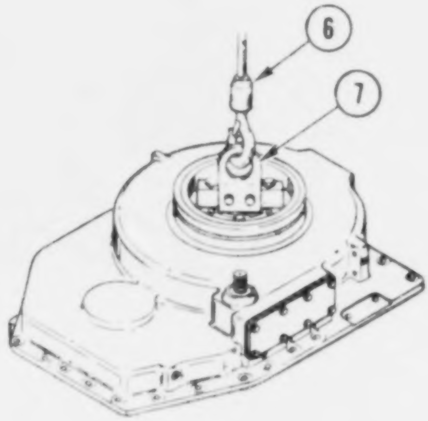
27. CLEAN GASKET MOUNTING SURFACE (1).
    a. Use wiping rag dampened with cleaning solvent.

27.1 INSTALL SPUR GEAR (1.1) ON SPUR GEARSHAFT (1.2).

28. INSTALL NEW GASKET (2).
    a. Apply petrolatum to mounting surface (1).
    b. Install gasket (2) over two pins (3).



29. INSTALL THRUST WASHER (4) ON GEARSHAFT (5).

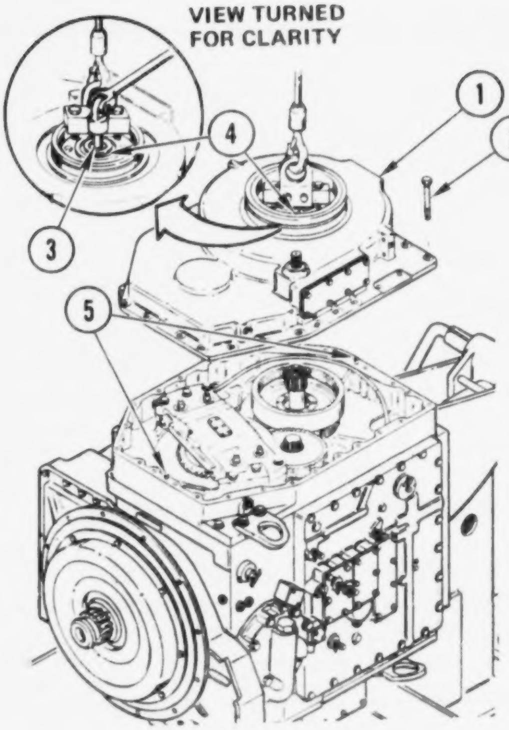


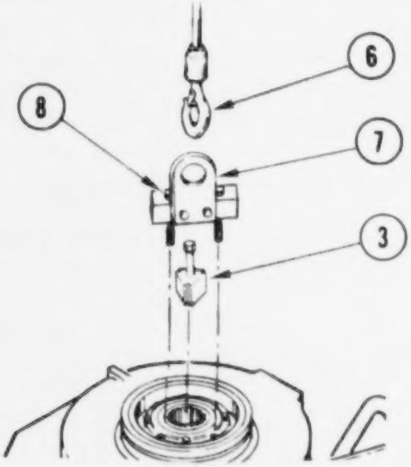
30. ATTACH LIFTING DEVICE (6) TO REMOVAL ASSEMBLY (7).

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

31. REPAIRER AND HELPER INSTALL OUTPUT HOUSING (1).
    a. Lift output housing (1).
    b. Slowly lower output housing (1) into place. Use four long screws (2) for alinement, one in each corner. Do not tighten screws (2).
    c. (H) Use 3/8-inch drive hinged handle and 3/4-inch socket on output housing installer (3). Rotate carrier (4) until output housing (1) drops into place over pins (5). Remove four screws (2).
    d. (H) Turn output housing installer (3) one complete turn to be sure output housing (1) is properly seated.

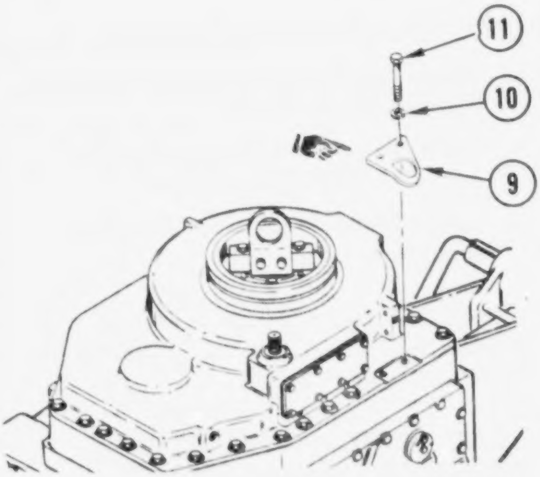




32. DETACH LIFTING DEVICE (6).

33. REMOVE REMOVAL ASSEMBLY (7).
    a. Unscrew two screws (8).
    b. Remove removal assembly (7).

34. REMOVE INSTALLER (3).



35. INSTALL LIFTING EYE (9).
    a. Secure eye (9) with two new lock washers (10) and 4 3/4-inch screws (11).

36. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (11) TO 40-45 ft-lb (6 mkg).

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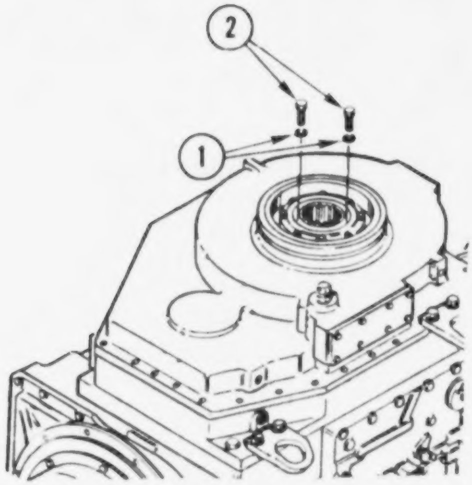

37. INSTALL TWO NEW LOCK WASHERS (1) AND SCREWS (2).

38. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (2) TO 75-100 in-lb (86-115 cmkg).

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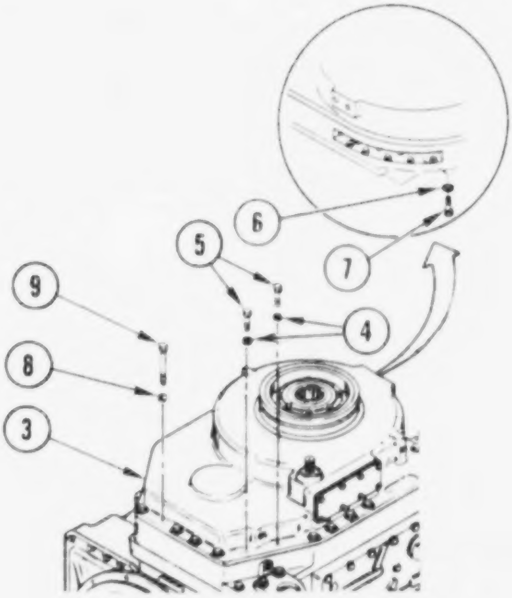
39. SECURE OUTPUT HOUSING (3).
    a. Install two new lock washers (4) and 1 1/4 inch screws (5).
    b. Install five new lock washers (6) and 1 1/2 inch screws (7).
    c. Install 19 new lock washers (8) and 4 1/2 inch screws (9).



40. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE TWO SCREWS (5) TO 40-45 ft-lb (6 mkg).

41. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 5/8-INCH CROWFOOT, TORQUE FIVE SCREWS (7) TO 40-45 ft-lb (6 mkg).

42. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 19 SCREWS (9) TO 40-45 ft-lb (6 mkg).

END OF TASK

REPAIR LEFT-HAND OUTPUT HOUSING

DESCRIPTION

This task covers: Disassemble (page 4-323). Assemble (page 4-330).

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Micrometer caliper set — (Item 52, App C)
- Retaining-ring pliers — (Item 60, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 82, App C)
- Socket wrench set — (Item 89, App C)
- Telescoping gage set — (Item 93, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Wire-twister pliers — (Item 107, App C)

Materials/Parts:

- Lockwire — (Item 5, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Cotter pin
- Gasket
- Lock washer (8)
- Retaining ring
- Special rubber seal

Personnel Required:

- Track Veh Rep 63H10
- Helper (H)

References:

- TM 9-214

Equipment Conditions:

Left-hand output housing on workbench. See page 4-314.

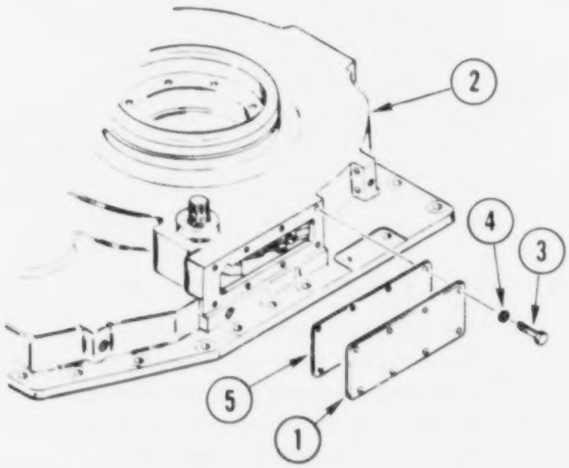
DISASSEMBLE

1. REMOVE LEFT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-336.

2. REMOVE ACCESS COVER (1) FROM LEFT-HAND OUTPUT HOUSING (2).

   a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove eight screws (3) and lock washers (4). Discard lock washers.

   b. Remove cover (1) and gasket (5). Discard gasket.



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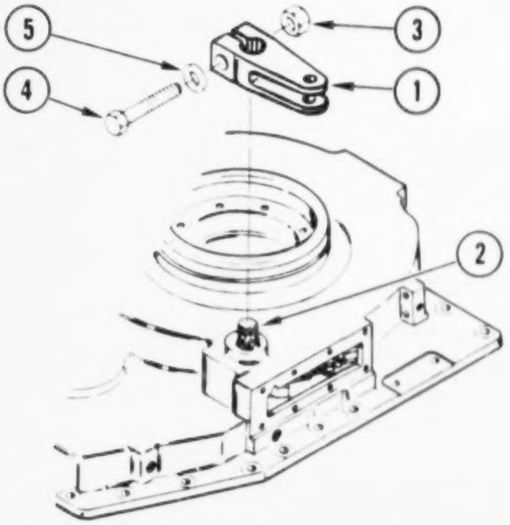
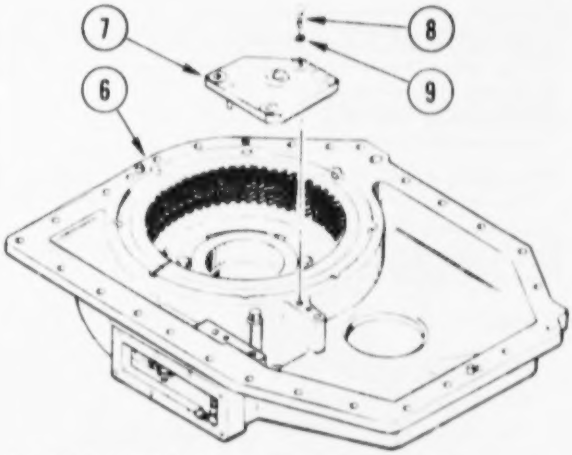


3. REMOVE LEVER ARM (1) FROM SHOULDERED SHAFT (2), IF INSTALLED.

   a. Remove self-locking nut (3), screw (4), and flat washer (5).

   b. Remove lever arm (1) from shaft (2).

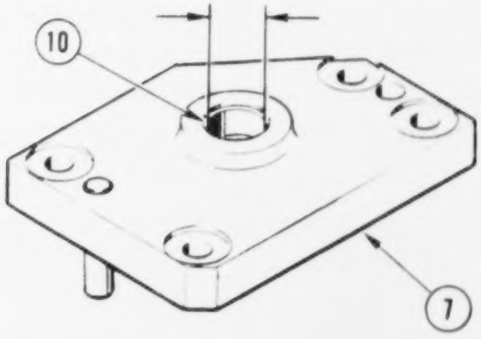


4. REPAIRER AND HELPER TURN HOUSING (6) OVER.

5. REMOVE SERVICE BRAKE COVER ASSEMBLY (7).

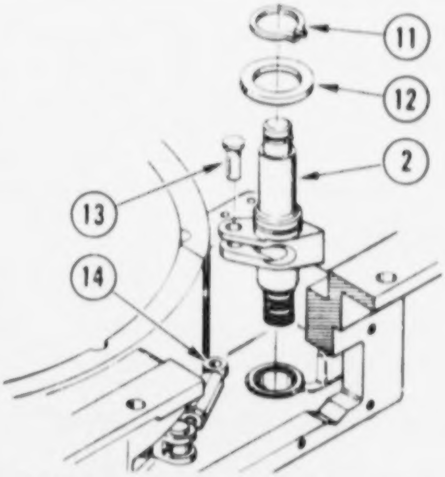
   a. Using 3/8-inch drive brace handle and 7/16-inch socket, remove four screws (8) and washers (9).

   b. Using plastic-faced hammer, remove cover (7).



6. CHECK COVER ASSEMBLY (7).

   a. Using micrometer caliper set and telescoping gage set, measure inside diameter of bushing (10). Replace plate (7) if measurement is greater than 0.7513 inch (19.083 mm).



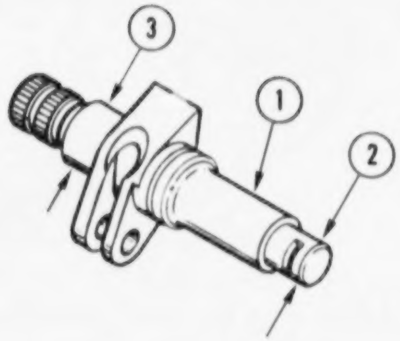
7. REMOVE SHOULDERED SHAFT (2).

   a. Using retaining-ring pliers, remove and discard retaining ring (11).

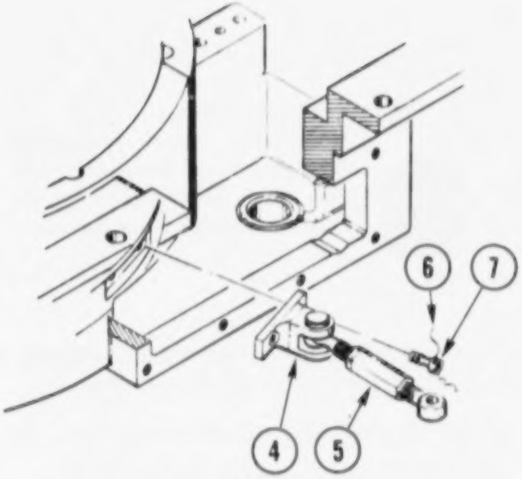
   b. Remove shim (12).

   c. Remove pin (13) and slide rod end connector (14) out of shaft (2).

   d. Remove shaft (2).



8. CHECK SHOULDERED SHAFT (1).
   a. Using micrometer caliper set, measure diameter (2). Replace shaft (1) if measurement is less than 0.7490 inch (19.025 mm).
   b. Using micrometer caliper set, measure diameter (3). Replace shaft (1) if measurement is less than 0.9990 inch (25.375 mm).

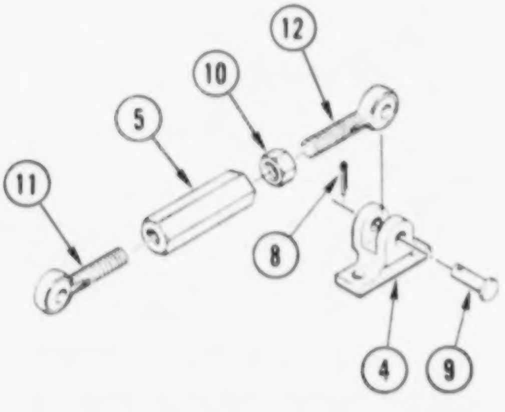


NOTE
All brake adjuster screws do not use lockwire.

9. REMOVE ROD END CLEVIS (4) AND BRAKE ADJUSTER (5).
   a. Remove and discard lockwire (6), if used, from two screws (7).
   b. Using 3/8-inch drive brace handle and 1/4-inch socket wrench attachment, remove two screws (7).
   c. Remove clevis (4) with adjuster (5).

NOTE
Rod end connector (11) has left-hand threads.

10. DISASSEMBLE ROD END CLEVIS (4) AND ADJUSTER (5).
    a. Remove and discard cotter pin (8).
    b. Remove pin (9) from clevis (4).
    c. Loosen hexagon nut (10) and remove two rod end connectors (11) and (12) from adjuster (5).
    d. Remove nut (10) from rod end connector (12).



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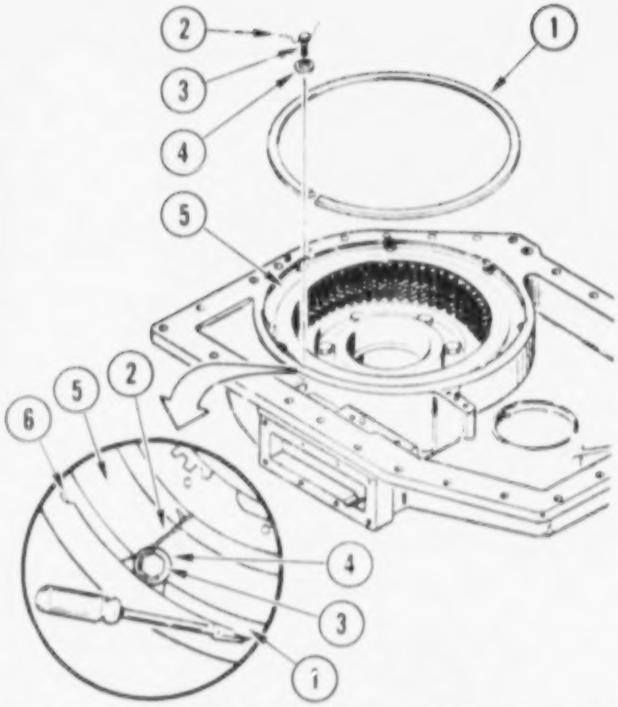
WARNING

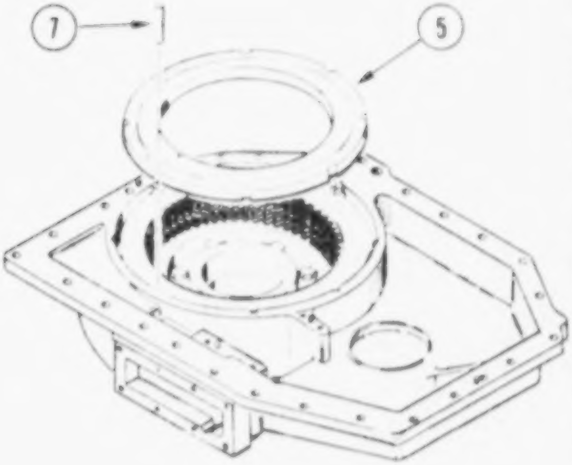
Use care when removing retaining ring. Retaining ring can fly. Personnel can be injured. Always wear goggles.

CAUTION

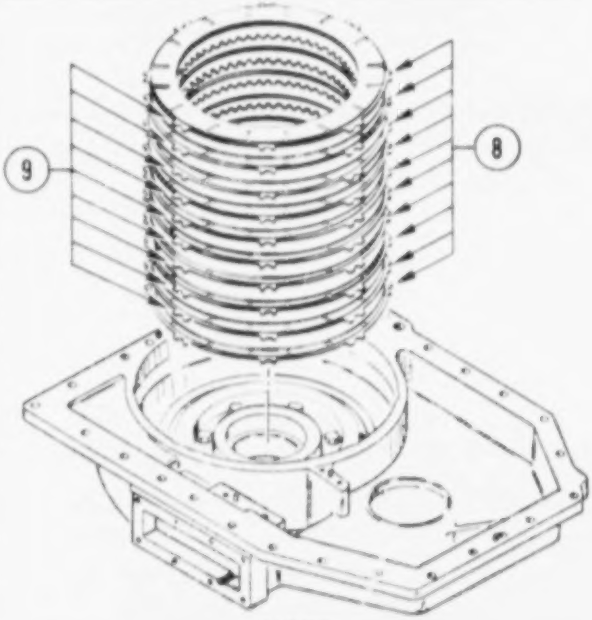
Do not mar housing while prying out retaining ring. Damage to equipment can occur.

11. REMOVE RETAINING RING (1).
    a. Remove and discard lockwire (2).
    b. Using 3/8-inch drive brace handle and 3/8-inch socket, remove bolt (3) and washer (4).
    c. Push down on retainer plate (5) and using screwdriver, pry out retaining ring (1). Use notches (6) as pry points.





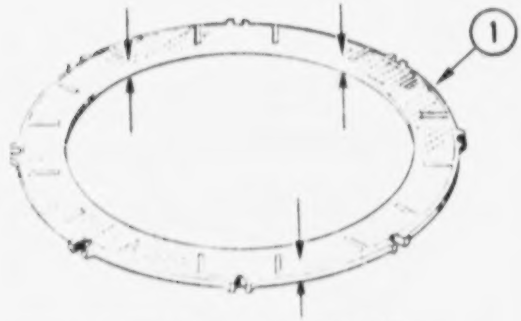
12. REMOVE PLATE (5) AND EIGHT PINS (7).



NOTE

Plates should be installed in same order and facing same way as removed.

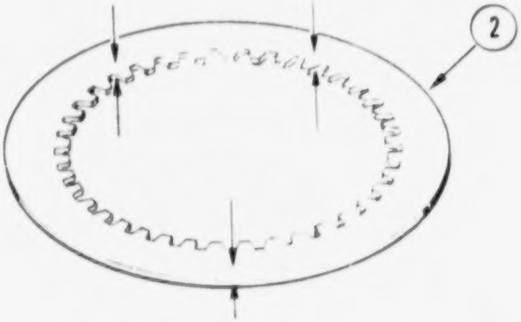
13. REMOVE 10 STATIONARY SERVICE BRAKE PLATES (8) AND 9 ROTATING SERVICE BRAKE PLATES (9).



14. CHECK 10 STATIONARY BRAKE PLATES (1).

   a. Using micrometer caliper set, measure thickness of each plate (1) in three places. Replace all 19 plates if any plate measures less than 0.080 inch (2.03 mm), and go to step 16.

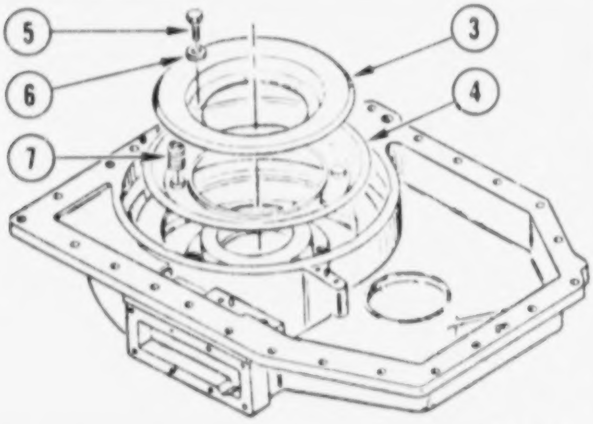
   b. Using flat surface and feeler gage, check for warpage on both inside and outside edges. Replace all 19 plates if warpage of any plate (1) is greater than 0.010 inch (.25 mm), and go to step 16.



15. CHECK NINE ROTATING BRAKE PLATES (2).

   a. Using micrometer caliper set, measure thickness of each plate (2) in three places. Replace all 19 plates if any plate measures less than 0.093 inch (2.36 mm), and go to step 16.

   b. Using flat surface and feeler gage, check for warpage on both inside and outside edges. Replace all 19 plates if warpage of any plate (2) is greater than 0.010 inch (.25 mm).

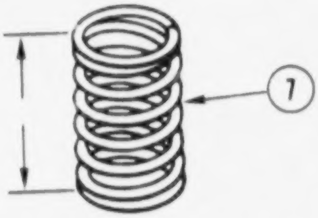


16. REMOVE INNER SPRING RETAINER (3) AND SPRING RETAINER PLATE (4).

   a. Using 3/8-inch drive brace handle and 7/16-inch socket, loosen six screws (5). Loosen two turns at a time to evenly relieve spring pressure.

   b. Remove six screws (5) and washers (6).

   c. Remove retainer (3), 10 springs (7), and plate (4).



17. CHECK 10 SPRINGS (7).

   a. Using indicator caliper, measure free length of spring (7). Replace spring if free length is less than 1.5 inch (38 mm).

   b. Repeat step 17a for all springs (7).

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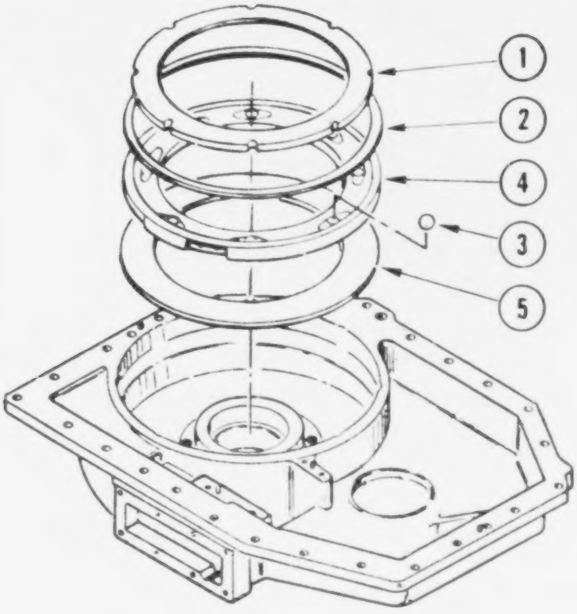
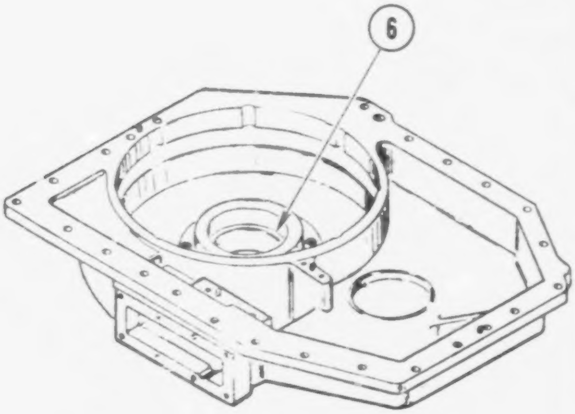
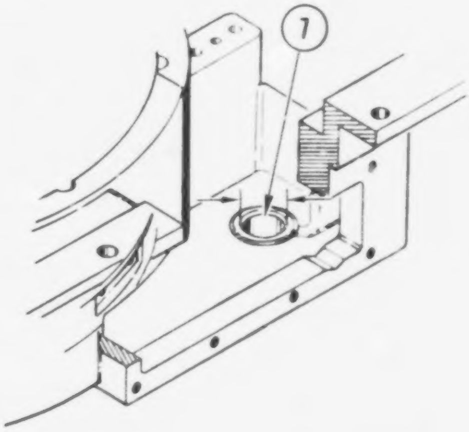


18. REMOVE INNER BRAKE ACTUATING PLATE (1).
    a. Lift out plate (1).
    b. Remove and discard special rubber seal (2).
    c. Remove eight bearing balls (3).
19. REMOVE OUTER BRAKE ACTUATING PLATE (4).
20. REMOVE THRUST WASHER (5).



21. INSPECT TAPERED ROLLER CUP (6).
    a. Inspect cup (6) for damage. See TM 9-214.
    b. If cup (6) is damaged, go to step 25. If not, go to step 22.



22. USING MICROMETER CALIPER SET AND TELESCOPING GAGE SET, MEASURE INSIDE DIAMETER OF SHAFT HOLE (7).
    a. If measurement is greater than 1.0017 inches (25.443 mm), go to step 25. If not, go to step 23.

23. REPAIRER AND HELPER TURN LEFT-HAND OUTPUT MECHANICAL HOUSING (1) OVER.

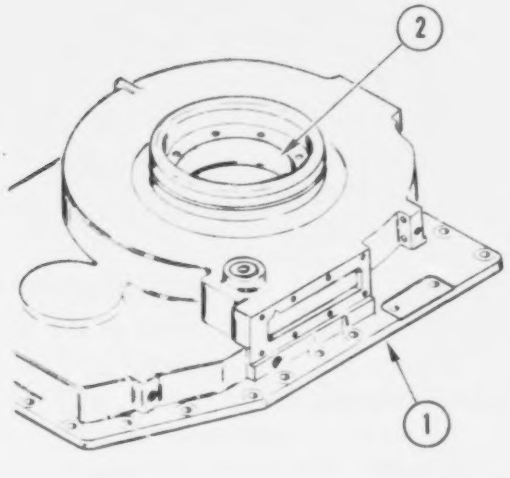
24. INSPECT TAPERED ROLLER CUP (2).

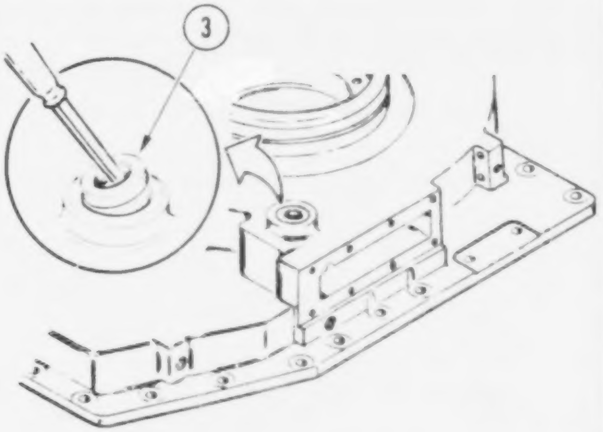
    a. Inspect cup (2) for damage. See TM 9-214.

    b. If cup (2) is damaged, go to step 25. If not, go to step 27.

25. REPLACE LEFT-HAND OUTPUT MECHANICAL HOUSING (1). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE MECHANICAL HOUSING TO DEPOT.

26. GO TO STEP 31.





27. INSPECT ENCASED SEAL (3).

    a. Inspect seal (3) for scoring, cuts, or other damage.

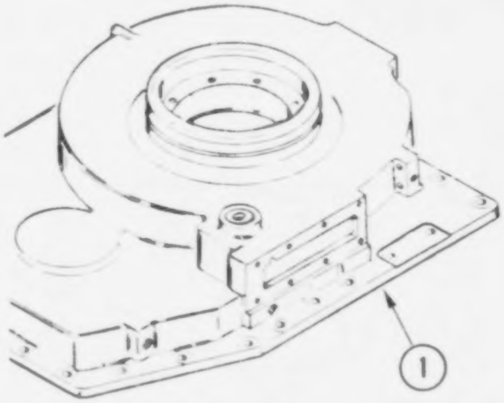
    b. If seal (3) is damaged, go to step 28. If not, go to step 29.

CAUTION

Do not mar housing while prying out seal. Damage to equipment can occur.

28. REMOVE SEAL (3).

    a. Using screwdriver, pry out and discard seal (3).



29. CLEAN LEFT-HAND OUTPUT MECHANICAL HOUSING (1).

    a. Clean housing and piece parts. See page 2-2.

30. INSPECT LEFT-HAND OUTPUT MECHANICAL HOUSING (1).

    a. Inspect housing, piece parts, and inserts. See page 2-5.

    b. Replace housing (1) if damaged. Record failure on DA FORM 2407 and return defective housing to depot.

    c. Repair inserts if damaged. See task REPAIR LEFT-HAND OUTPUT HOUSING INSERTS, page 4-348.

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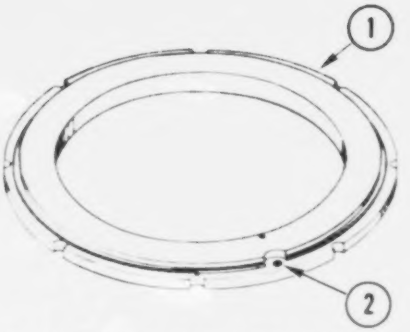
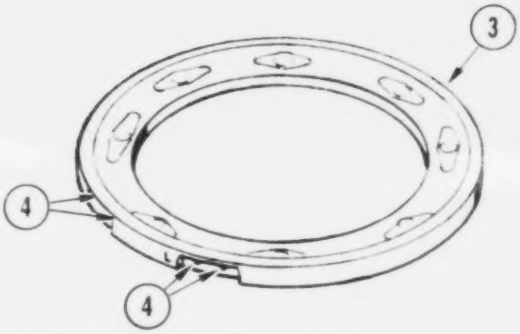


31. INSPECT LEFT-HAND RETAINER PLATE ASSEMBLY (1).

   a. Inspect plate (1) and insert (2) for damage. See page 2-5.

   b. Repair insert if damaged. See task REPAIR LEFT-HAND RETAINER PLATE ASSEMBLY INSERT, page 4-352.

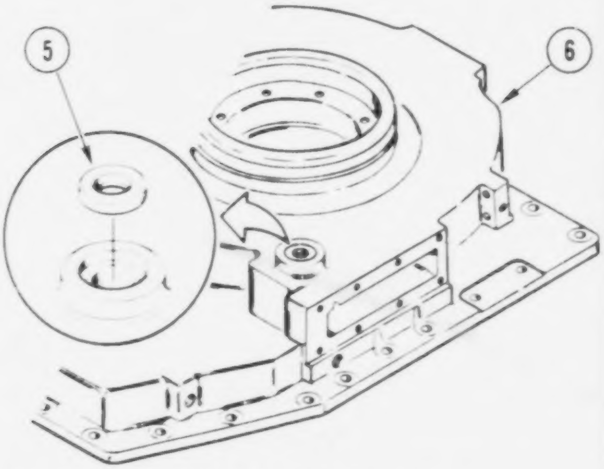


32. INSPECT LEFT-HAND OUTER BRAKE ACTUATING PLATE (3).

   a. Inspect plate (3) and screw hole inserts (4) for damage. See page 2-5.

   b. Repair inserts if damaged. See task REPAIR LEFT-HAND BRAKE ACTUATING PLATE INSERTS, page 4-350.

ASSEMBLE

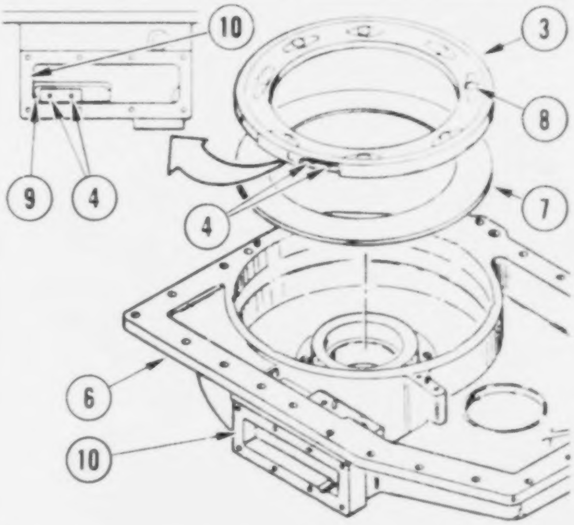


33. INSTALL NEW SEAL (5).

   a. If seal (5) was removed or housing (6) was replaced, go to step 33b. If not, go to step 34.

   b. Coat new seal (5) with transmission oil.

   c. Using plastic-faced hammer, tap seal (5) into place with flat metal surface facing outward until seal is fully seated.



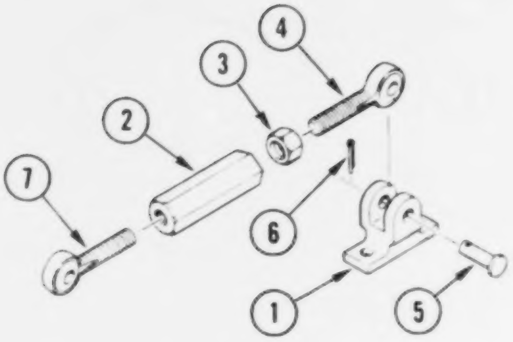
34. REPAIRER AND HELPER TURN HOUSING (6) OVER.

35. INSTALL OUTER BRAKE ACTUATING PLATE (3).

   a. Coat thrust washer (7) with transmission oil and install.

   b. Position plate (3) with eight bearing ball recesses (8) showing.

   c. Aline two screw holes (4) and "L"-mark (9) with adjustment cover area (10).



NOTE

Rod end connector (7) has left-hand threads.

36. ASSEMBLE ROD END CLEVIS (1) AND ADJUSTER (2).

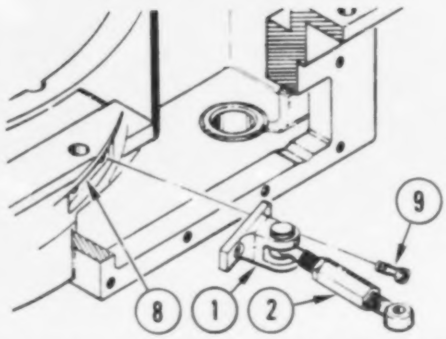
   a. Install nut (3) on rod end connector (4).

   b. Install rod end connector (4) four turns into adjuster (2).

   c. Aline rod end connector (4) with clevis (1). Install pin (5) and new cotter pin (6).

   d. Install rod end connector (7) four turns into adjuster (2).

39. (DELETED)



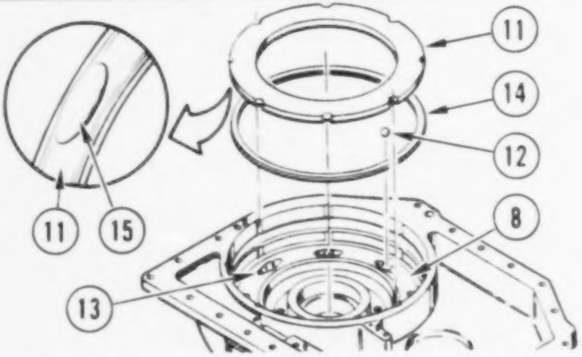
37. INSTALL CLEVIS (1) AND ADJUSTER (2).

   a. Place clevis (1) and adjuster (2) on plate (8).

   b. Coat threads of two screws (9) with sealant compound.

   c. Using 3/8-inch drive brace handle and 1/4-inch socket wrench attachment, install two screws (9).

38. USING 1/2-INCH DRIVE TORQUE WRENCH WITH SOCKET WRENCH ADAPTER, EXTENSION, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (9) TO 20-25 ft-lb (3 mkg).



40. INSTALL INNER BRAKE ACTUATING PLATE (11).

   a. Install eight bearing balls (12) in eight recesses (13) on outer plate (8).

   b. Coat new special rubber seal (14) with transmission oil.

   c. Install seal (14) on inner plate (11).

   d. Install inner plate (11) with recesses (15) facing balls (12). Be sure plate is firmly seated on balls.

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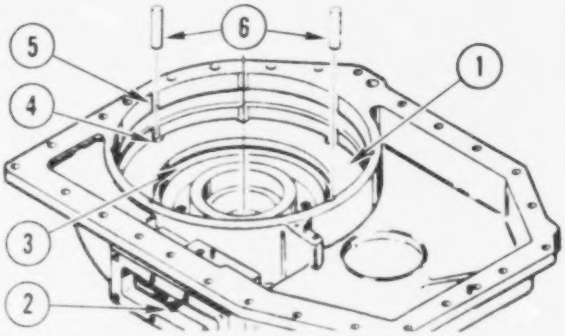
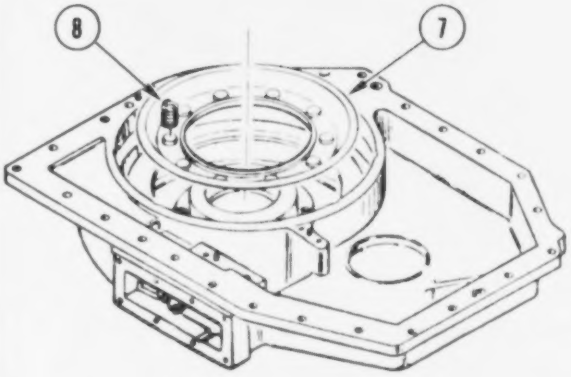
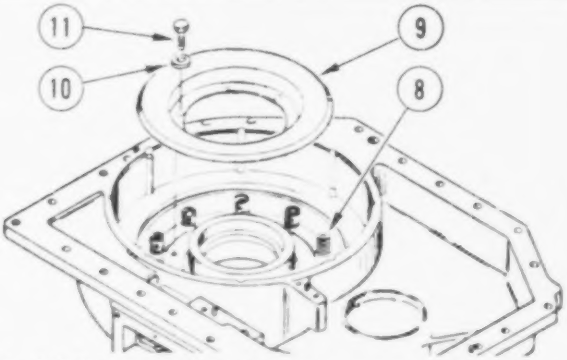


41. ALINE INNER PLATE (1).
    - a. (H) Hold inner plate (1) down by hand.
    - b. Using clevis (2) as lever, move outer plate (3) until plate (1) is at lowest position.
    - c. Helper apply pressure to plates (3) and (1). Repairer aline slots (4) in plate (1) with eight slots (5) by moving clevis (2).
    - d. Install two pins (6) to hold inner plate (1) in place.



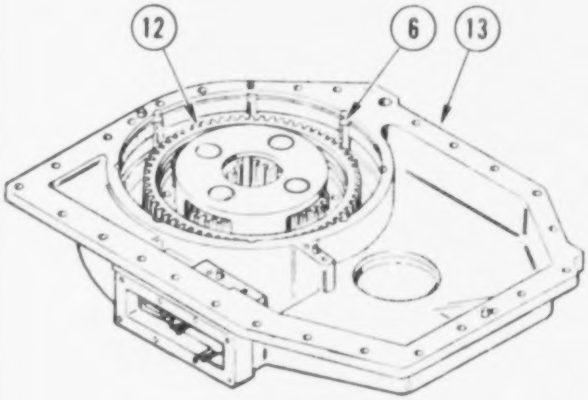
42. INSTALL SPRING RETAINER PLATE (7).

43. PLACE 10 SPRINGS (8) ON RETAINER (7).



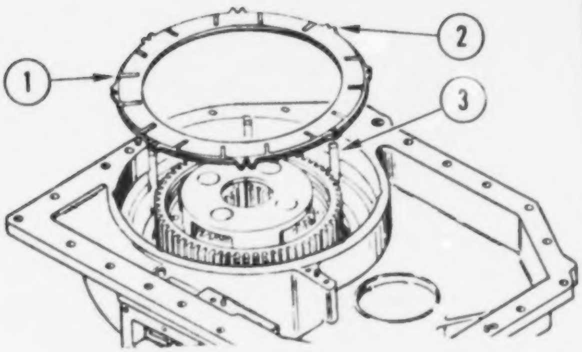
44. INSTALL INNER SPRING RETAINER (9).
    - a. Aline retainer (9).
    - b. (H) Hold retainer (9) down.
    - c. Using 3/8-inch drive brace handle and 7/16-inch socket, install six washers (10) and screws (11). Tighten six screws two turns at a time to evenly compress springs (8).

45. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER, EXTENSION, AND 7/16-INCH SOCKET, TORQUE SIX SCREWS (11) 10-12 ft-lb (1-2 mkg).



46. INSTALL REMAINING SIX PINS (6).

47. PLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY (12) IN OUTPUT HOUSING (13).



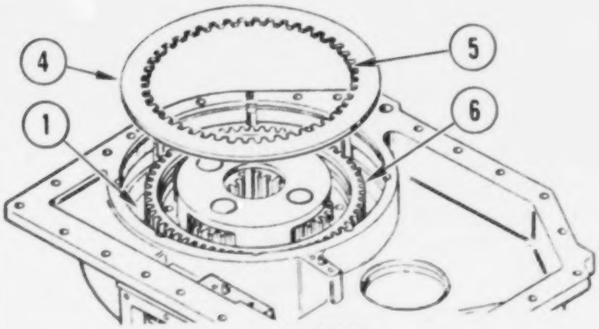
CAUTION

Do not install brake plates without coating with transmission oil. Equipment can be damaged.

NOTE

Plates should be installed in the same order and facing same way as removed.

48. INSTALL STATIONARY SERVICE BRAKE PLATE (1).
    a. Coat plate (1) with transmission oil before assembly.
    b. Aline plate tabs (2) with pins (3).
    c. Install plate (1) so it is facing same way as removed.

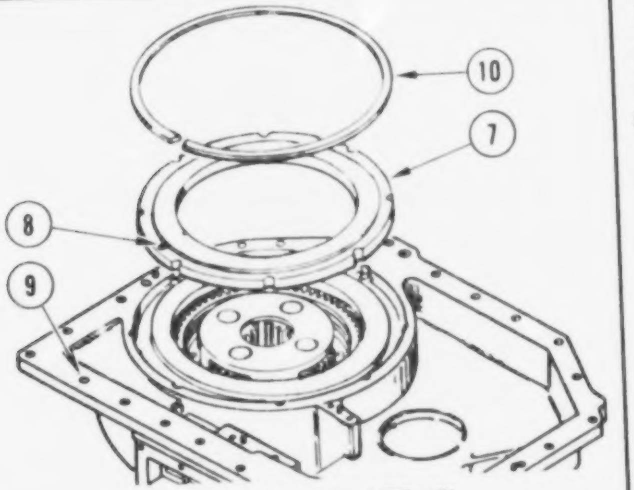


CAUTION

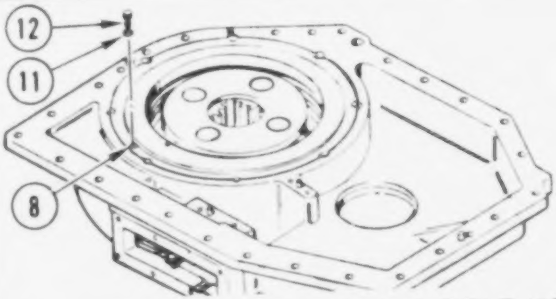
Do not install brake plates without coating with transmission oil. Equipment can be damaged.

49. INSTALL ROTATING SERVICE BRAKE PLATE (4).
    a. Coat plate (4) with transmission oil before assembly.
    b. Aline plate splines (5) with splines on carrier (6).
    c. Install plate (4) so it is facing the same way as removed.

50. REPEAT STEPS 48 AND 49 UNTIL 10 STATIONARY PLATES (1) AND 9 ROTATING PLATES (4) ARE INSTALLED.



51. INSTALL RETAINER PLATE (7).
    a. Install plate (7) with bolt hole (8) facing screw hole (9).
    b. Install retaining ring (10) with slot alined with bolt hole (8).



52. INSTALL WASHER (11) AND BOLT (12).
    a. Coat threads of bolt (12) with sealant compound.
    b. Using 3/8-inch drive brace handle and 3/8-inch socket, install washer (11) and bolt (12) in hole (8).

53. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/8-INCH SOCKET, TORQUE BOLT (12) TO 60-75 in-lb (69-86 cmkg).

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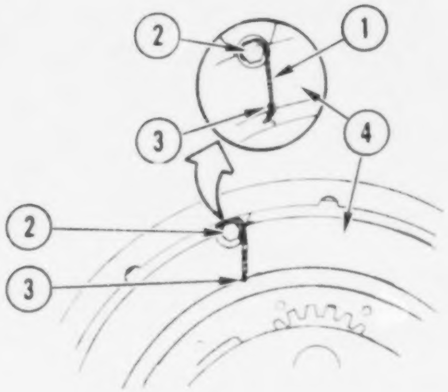
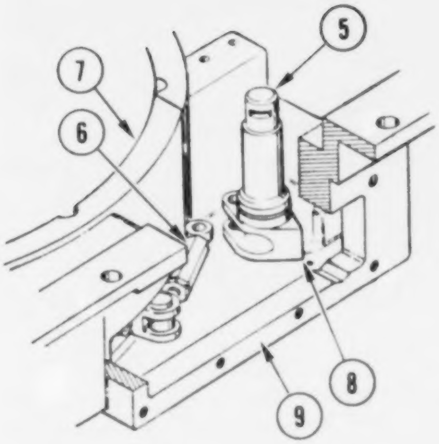


54. INSTALL LOCKWIRE (1).

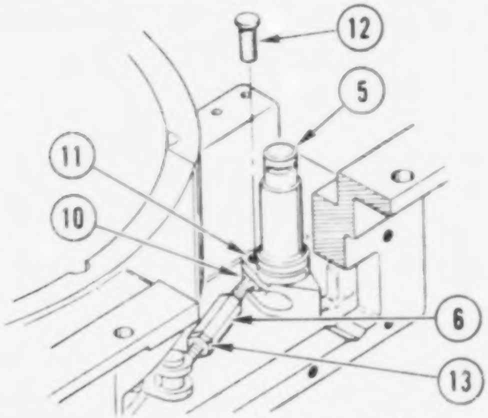
   a. Using wire-twister pliers, install lockwire (1) through bolt (2) and through hole (3) in plate (4).



55. INSTALL SHOULDERED SHAFT (5).

   a. Position adjuster (6) against housing (7).

   b. Insert shaft (5) into housing (7) so that pointer (8) is toward housing face (9).



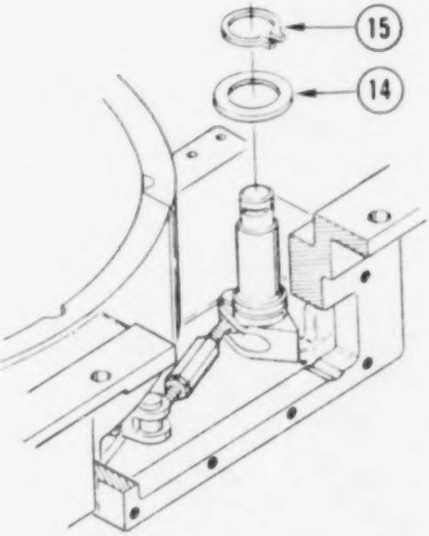
56. CONNECT SHAFT (5) TO ROD END CONNECTOR (10).

   a. Position rod end connector (10) under pin hole (11).

   b. Turn adjuster (6) to aline rod end connector (10) with hole (11).

   c. Insert pin (12) in hole (11).

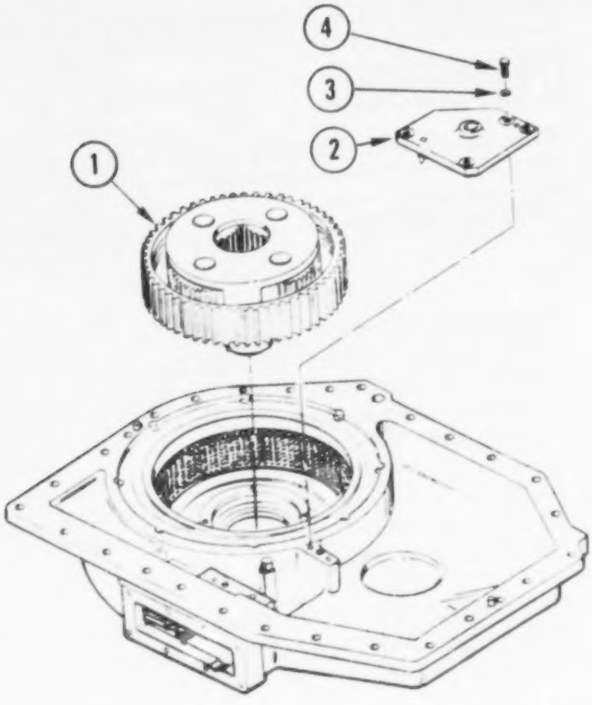
57. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 9/16 INCH CROWFOOT, TORQUE NUT (13) TO 17-20 ft-lb (2-3 mkg).



58. INSTALL SHIM (14).

59. INSTALL NEW RETAINING RING (15).

   a. Using retaining-ring pliers, install retaining ring (15).



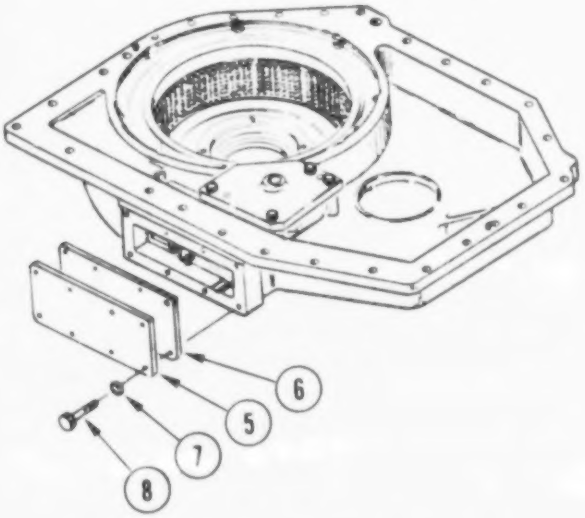
60. REMOVE OUTPUT CARRIER ASSEMBLY (1).

61. INSTALL SERVICE BRAKE COVER ASSEMBLY (2).

    a. Position cover (2).

    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install four washers (3) and screws (4).

62. USING 1/2-INCH DRIVE TORQUE WRENCH WITH SOCKET WRENCH ADAPTER AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (4) TO 10-12 ft-lb (1-2 mkg).



63. INSTALL COVER (5).

    a. Install new gasket (6) and cover (5).

    b. Using 3/8-inch drive brace handle and 7/16-inch socket, install eight new lock washers (7) and screws (8).

64. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (8) TO 75-100 in-lb (86-115 cmkg).

65. INSTALL LEFT-HAND OUTPUT CARRIER ASSEMBLY. See task REPLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-336.

END OF TASK

REPLACE LEFT-HAND OUTPUT CARRIER ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-336). Install (page 4-340).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Micrometer caliper set — (Item 52, App C)
Micrometer depth gage — (Item 54, App C)
Retaining-ring pliers — (Item 59, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Gasket
Lock washer (8)

Materials/Parts: (cont)

Shim set
Measuring plate — (Item 7, App D)
Wood block (2) — (Item 2, App D)
Wood block (2) — (Item 4, App D)

Personnel Required:

Track Veh Rep 63H10
Helper (H)

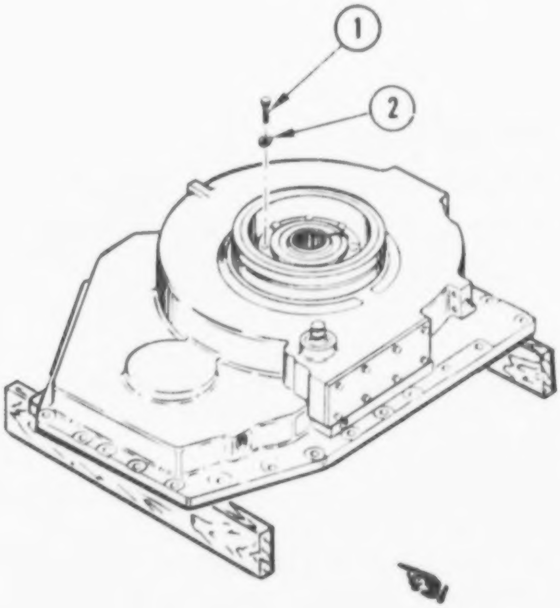
References:

TM 9-214

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

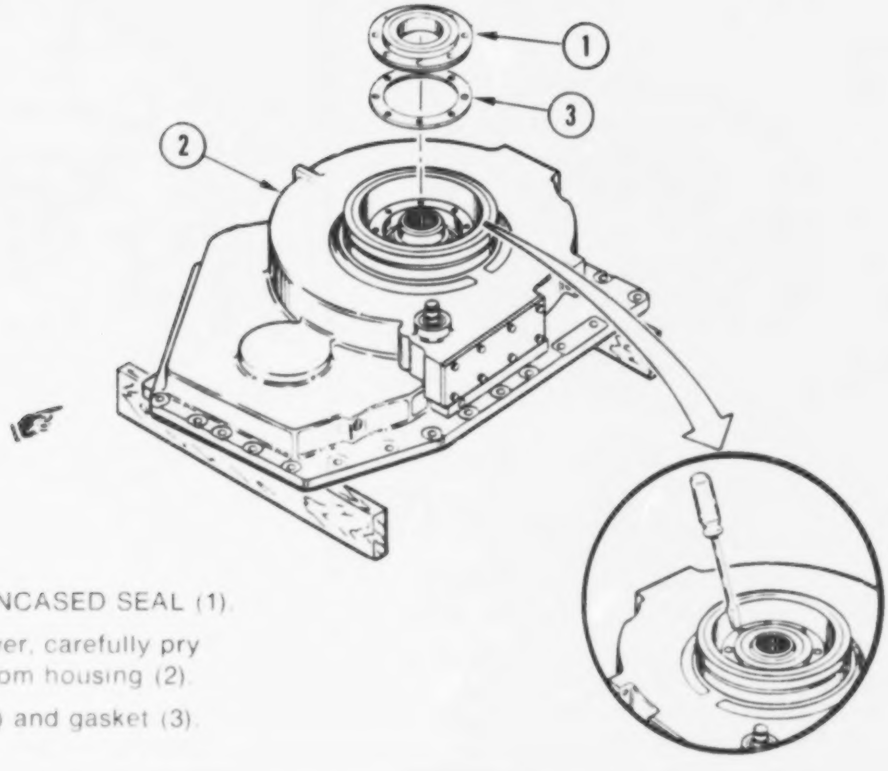
REMOVE



1. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

2. REMOVE EIGHT SCREWS (1).

   a. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, remove eight screws (1) and lock washers (2). Discard lock washers.



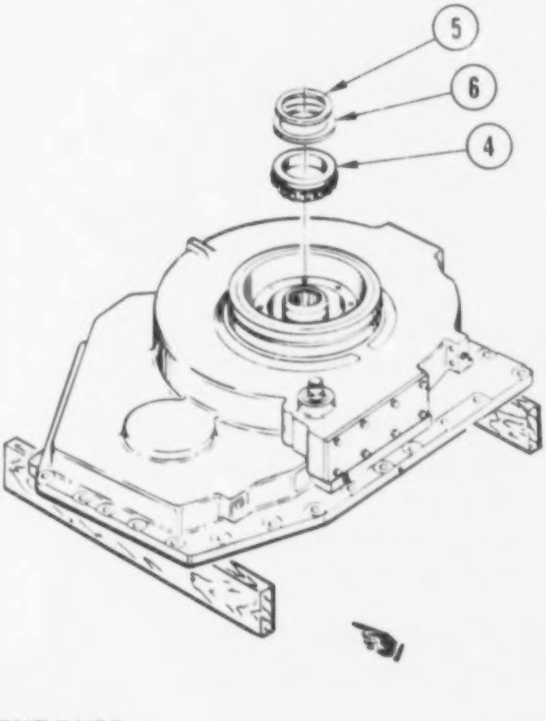
3. REMOVE PLAIN ENCASED SEAL (1).
   - a. Using screwdriver, carefully pry seal (1) away from housing (2).
   - b. Remove seal (1) and gasket (3). Discard gasket.

WARNING

Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

CAUTION

Do not scratch carrier shaft when removing retaining ring. Equipment can be damaged.



4. REMOVE TAPERED CONE AND ROLLERS (4).
   - a. Using retaining-ring pliers, remove retaining ring (5) and thrust washer (6). Discard thrust washer.
   - b. Remove cone and rollers (4).

5. INSPECT CONE AND ROLLERS (4).
   - a. Inspect cone and rollers (4) for damage. See TM 9-214.
   - b. Replace cone and rollers (4) if damaged.

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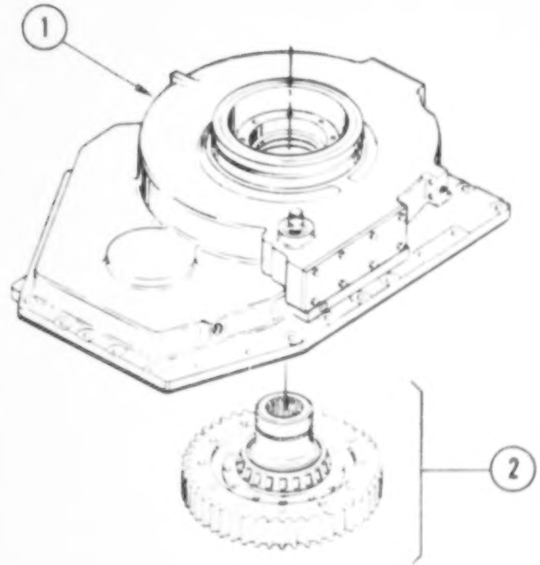
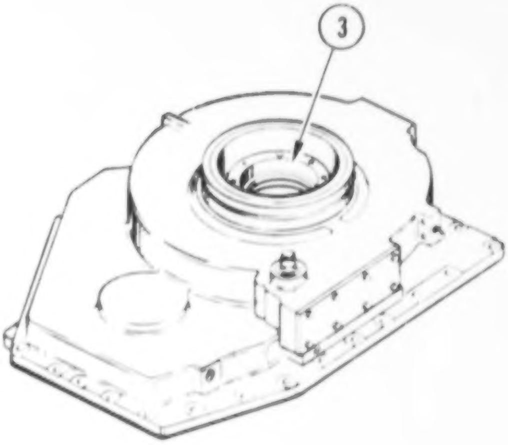
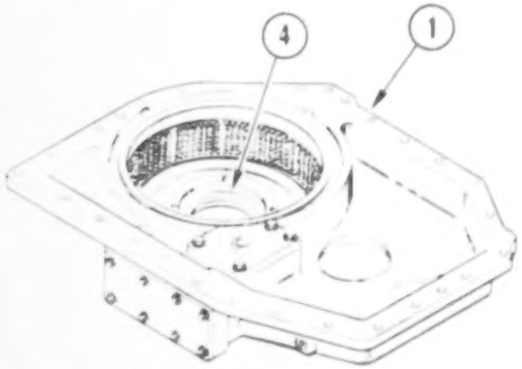


6. REPAIRER AND HELPER LIFT OUTPUT HOUSING (1) OFF OUTPUT CARRIER ASSEMBLY (2).



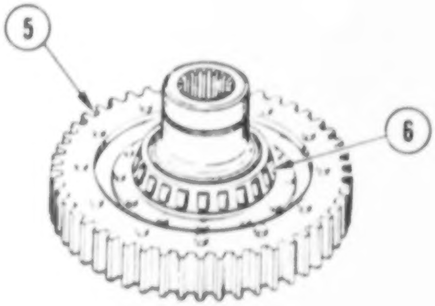
7. INSPECT TAPERED ROLLER CUP (3).
   a. Inspect cup (3) for damage. See TM 9-214.
   b. If cup (3) is damaged, go to step 10. If not, go to step 8.



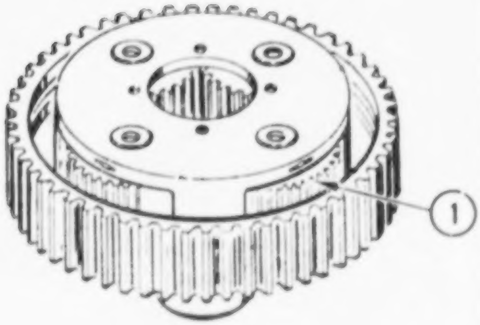
8. REPAIRER AND HELPER TURN OUTPUT HOUSING (1) OVER.

9. INSPECT TAPERED ROLLER CUP (4).
   a. Inspect cup (4) for damage. See TM 9-214.
   b. If cup (4) is damaged, go to step 10. If not, go to step 11.

10. REPAIR LEFT-HAND OUTPUT HOUSING, page 4-323.



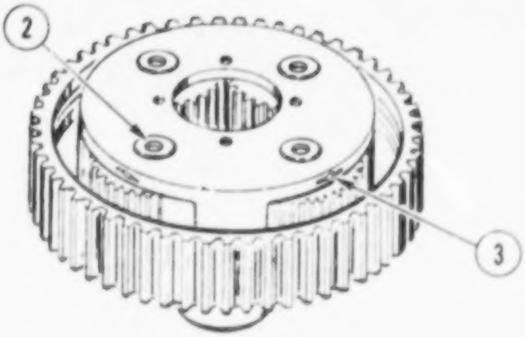
11. INSPECT SERVICE BRAKE HUB (5) AND TAPERED CONE AND ROLLERS (6).
    a. Inspect service brake hub (5) for damage. See page 2-5.
    b. Inspect cone and rollers (6) for damage. See TM 9-214.
    c. If damage is found, go to step 14. If not, go to step 12.



12. INSPECT PLANETARY GEARS (1)

a. Inspect four gears (1) for damage. See page 2-5.

b. If gears (1) are not damaged and rotate freely, go to step 13. If gears are damaged, do not rotate freely, go to step 14.



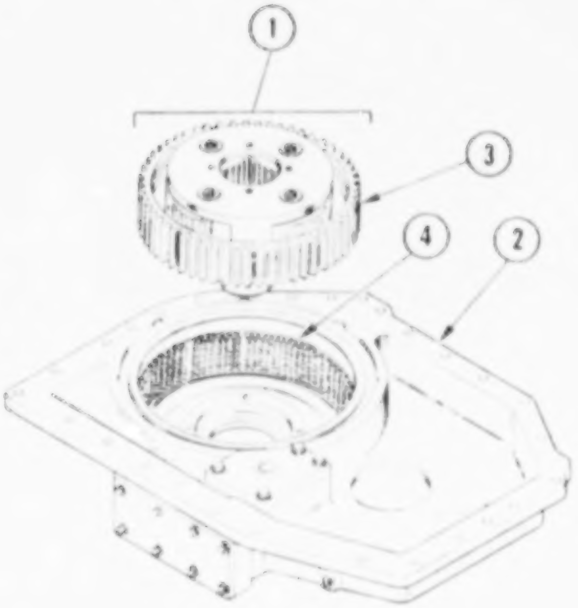
13. INSPECT PLANETARY GEAR SPINDLES (2) AND PINS (3)

a. If all spindles (2) and pins (3) are tight, go to step 15. If not, go to step 14.

14. REPAIR LEFT-HAND OUTPUT CARRIER ASSEMBLY, page 4-345

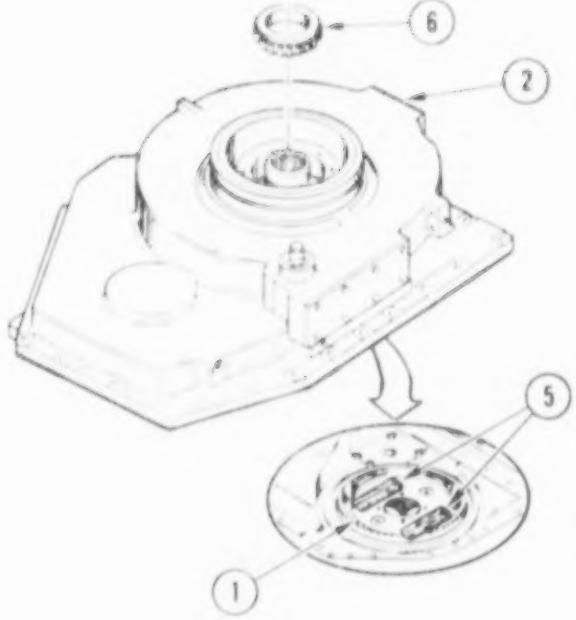
GO TO NEXT PAGE

INSTALL



15. INSTALL CARRIER ASSEMBLY (1) IN HOUSING (2).
    a. Repairer and helper position housing (2) with bottom side up.
    b. Aline gear teeth of hub (3) with brake plate teeth (4).
    c. Install carrier assembly (1) in housing (2).

16. REPAIRER AND HELPER TURN OUTPUT HOUSING (2) OVER WHILE HOLDING CARRIER ASSEMBLY (1) IN PLACE.



17. REPAIRER AND HELPER PLACE TWO WOOD BLOCKS (5) (ITEM 2) UNDER CARRIER ASSEMBLY (1).

18. INSTALL CONE AND ROLLERS (6).

19. (H) HOLD HOUSING (2) DURING STEPS 20 THROUGH 39 TO PREVENT HOUSING FROM TIPPING.

WARNING

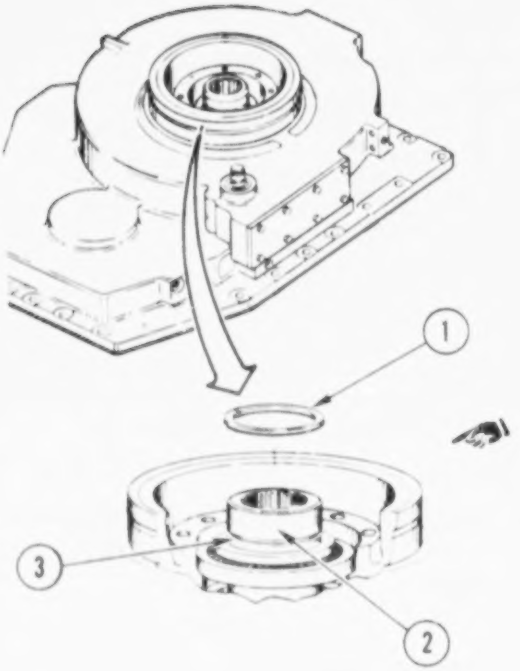
Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

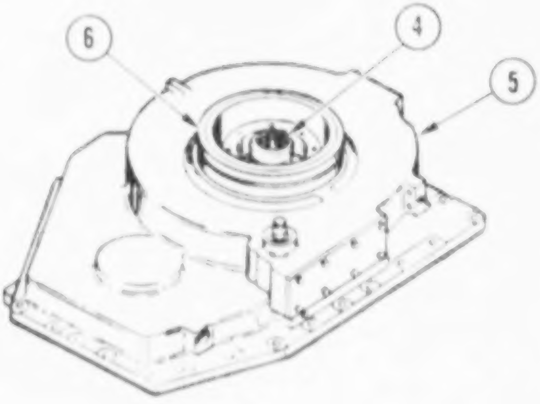
CAUTION

Do not scratch carrier shaft surface when installing retaining ring. Equipment can be damaged.

20. INSTALL RETAINING RING (1) ON CARRIER SHAFT (2).

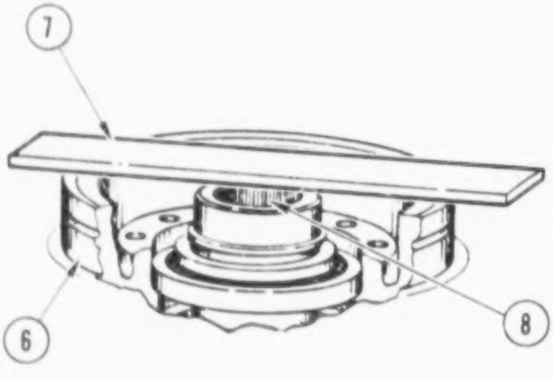
    a. Using retaining-ring pliers, install retaining ring (1) sharp-face up in grove (3) on carrier shaft (2).





21. SEAT CARRIER ASSEMBLY (4) IN HOUSING (5).

    a. Using plastic-faced hammer, gently tap output housing collar (6) down to seat carrier assembly (4).



22. POSITION MEASURING PLATE (7) ACROSS OUTPUT HOUSING COLLAR (6).

    a. Place plate (7) across output housing collar (6).

    b. Position plate (7) to cover half of output carrier splined hole (8).

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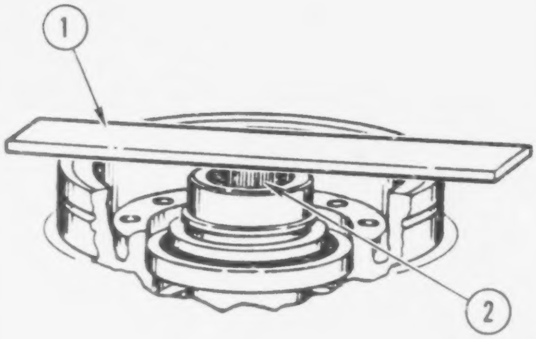
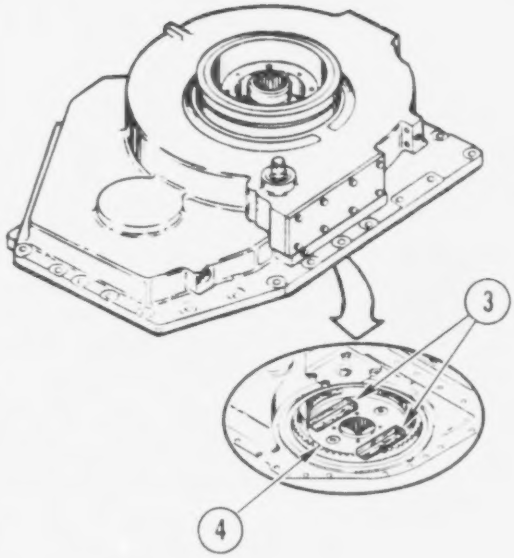


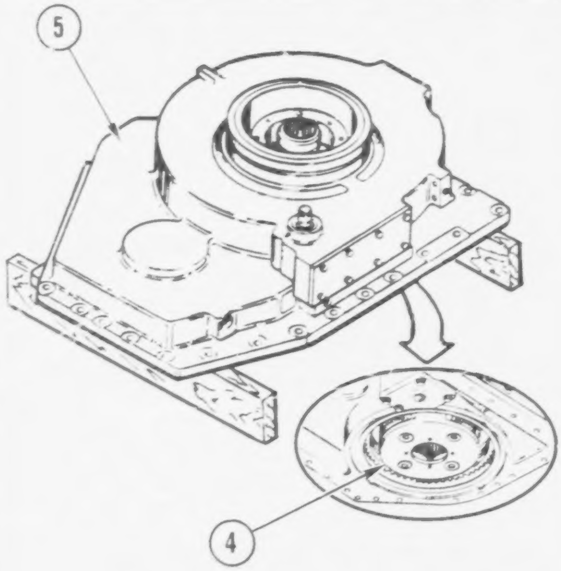
NOTE

The object of these calculations is to find washer thickness needed to get correct end-play of carrier assembly in housing.

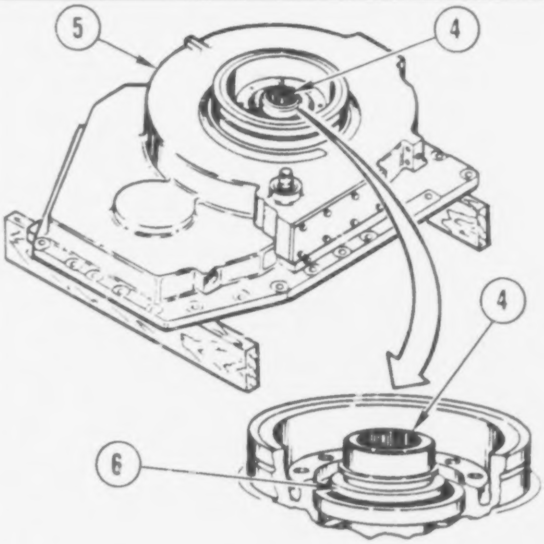
23. OBTAIN DIMENSION A.
    a. Using depth gage, measure distance from top of plate (1) to bottom of splined hole (2).
    b. Record results as dimension A.
    c. Remove plate (1).



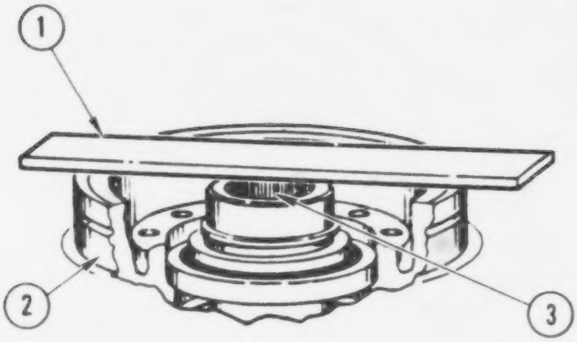
24. REPAIRER AND HELPER REMOVE TWO WOOD BLOCKS (3) FROM UNDER CARRIER ASSEMBLY (4).



25. PLACE OUTPUT HOUSING (5) ON TWO WOOD BLOCKS (ITEM 4) SO THAT BOTTOM OF CARRIER ASSEMBLY (4) IS NOT TOUCHING WORKBENCH.



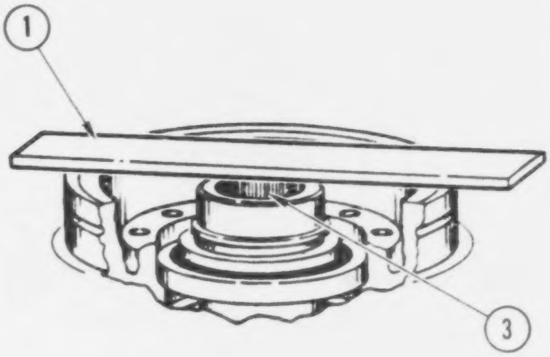
26. SEAT CONE AND ROLLERS (6) IN HOUSING (5).
    a. Using plastic-faced hammer, gently tap carrier assembly (4) down until cone and rollers (6) are fully seated.



27. POSITION MEASURING PLATE (1) ACROSS OUTPUT HOUSING COLLAR (2).

   a. Place plate (1) across output housing collar (2).

   b. Position plate (1) to cover half of output carrier splined hole (3).



28. OBTAIN DIMENSION B.

   a. Using depth gage, measure distance from top of plate (1) to bottom of splined hole (3).

   b. Record results as dimension B.

   c. Remove plate (1).

STEP 28 DIMENSION B 0._____ INCH
STEP 23 DIMENSION A – 0._____ INCH
STEP 29 DIMENSION C = 0._____ INCH

29. OBTAIN DIMENSION C.

   a. Subtract dimension A from dimension B.

   b. Record as dimension C.

30. SELECT NEW WASHER (4) FROM SHIM SET.

   a. Select one washer (4) from shim set that is 0.006 to 0.013 inch (0.15 to 0.33 mm) less than dimension C.

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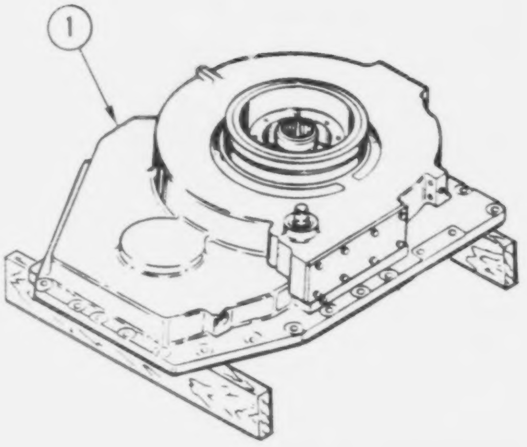
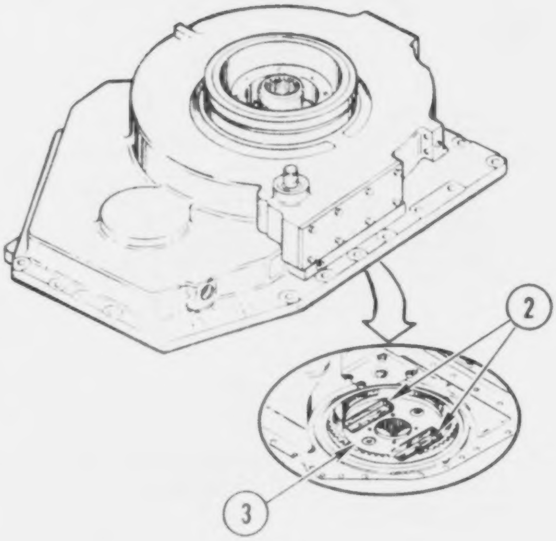
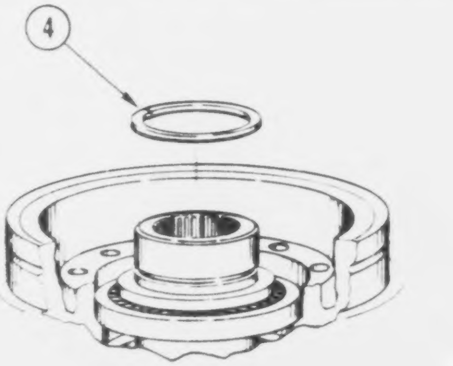


31. REMOVE TWO WOOD BLOCKS FROM UNDER OUTPUT HOUSING (1).



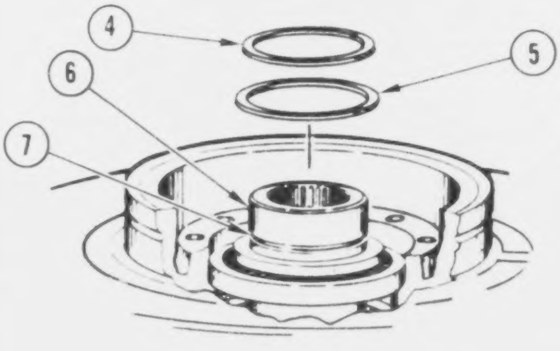
32. REPAIRER AND HELPER PLACE TWO WOOD BLOCKS (2) (ITEM 2) UNDER CARRIER ASSEMBLY (3).



WARNING

Retaining ring is installed under high tension. Use care when removing and installing retaining ring. Personnel can be injured. Always wear goggles.

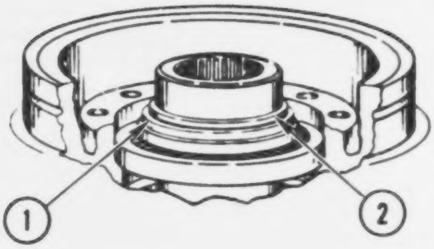
33. REMOVE RETAINING RING (4).
    a. Using retaining-ring pliers, remove retaining ring (4).



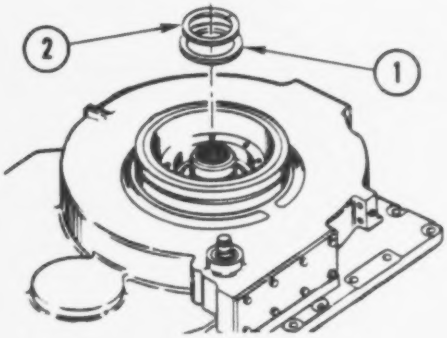
CAUTION

Do not scratch carrier shaft surface when installing retaining ring. Equipment can be damaged.

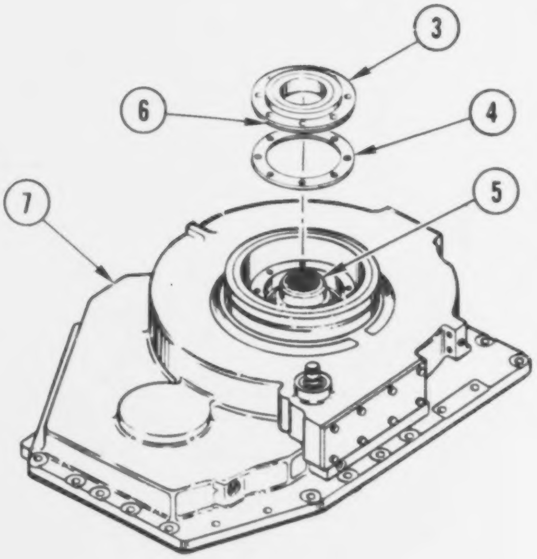
34. INSTALL NEW WASHER (5) AND RETAINING RING (4).
    a. Install washer (5) on shaft (6).
    b. Using retaining-ring pliers, install retaining ring (4) sharp-face up in groove (7) on shaft (6).



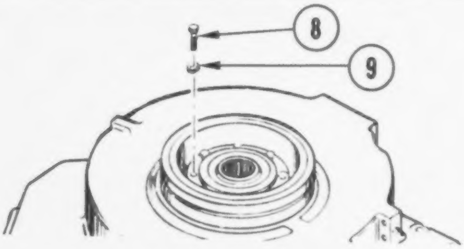
35. CHECK GAP BETWEEN WASHER (1) AND RETAINING RING (2).
    a. If gap is 0.006 to 0.013 inch (0.15 to 0.33 mm), go to step 37. If not, go to step 36.



36. REMOVE RETAINING RING (2) AND WASHER (1).
    a. Using retaining-ring pliers, remove retaining ring (2).
    b. Remove washer (1).
    c. Go to step 20.



37. INSTALL SEAL (3).
    a. Install new gasket (4).
    b. Install seal (3) on shaft (5) with beveled end (6) toward housing (7).



38. INSTALL EIGHT SCREWS (8).
    a. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, install eight new lock washers (9) and screws (8).

39. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 7/16-INCH SOCKET, TORQUE EIGHT SCREWS (8) TO 75-100 in-lb (86-115 cmkg).

40. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

END OF TASK

REPAIR LEFT-HAND OUTPUT CARRIER ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-345). Assemble (page 4-347).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App C)

Personnel Required:

Track Veh Rep 63H10

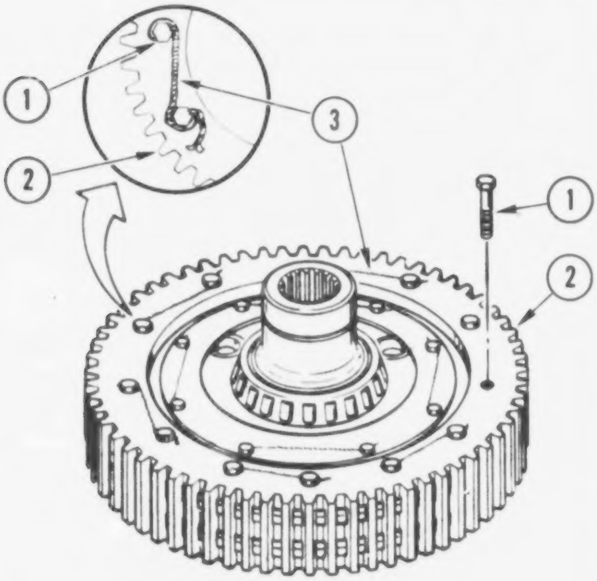
References:

TM 9-214

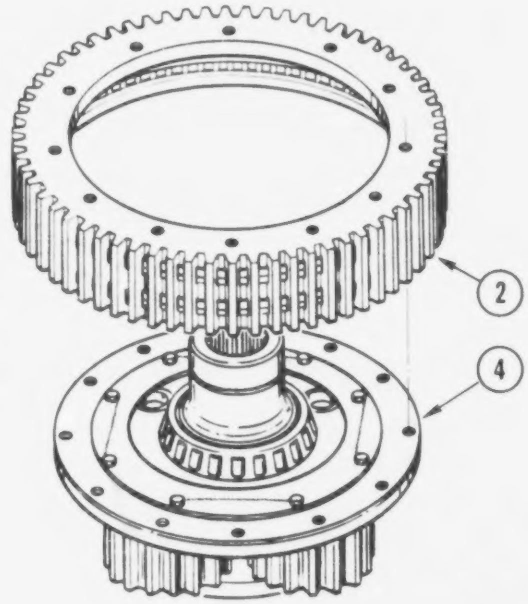
Equipment Conditions:

Left-hand output carrier assembly on workbench. See page 4-336.

DISASSEMBLE



1. REMOVE 12 SCREWS (1) FROM SERVICE BRAKE HUB (2).
   a. Remove and discard lockwire (3) securing 12 screws (1).
   b. Remove 12 screws (1) from hub (2).



2. REMOVE HUB (2) FROM OUTPUT CARRIER (4).
3. INSPECT HUB (2) FOR DAMAGE. See page 2-5.
   a. Replace hub (2) if damaged.

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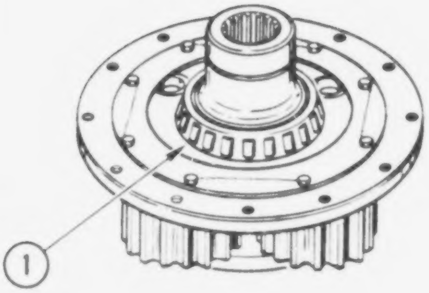
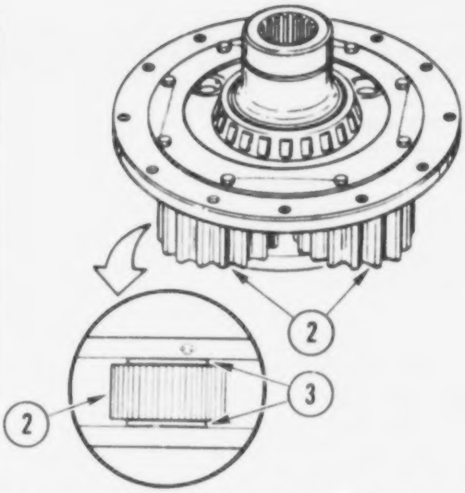


4. INSPECT TAPERED CONE AND ROLLERS (1).
   a. Inspect cone and rollers (1) for damage. See TM 9-214.
   b. If cone and rollers (1) are damaged, go to step 9. If not, go to step 5.



5. INSPECT FOUR SPUR GEARS (2).
   a. Inspect four gears (2) for damage. See page 2-5.
   b. If gears (2) are not damaged and rotate freely, go to step 6. If gears are damaged or do not rotate freely, go to step 9.

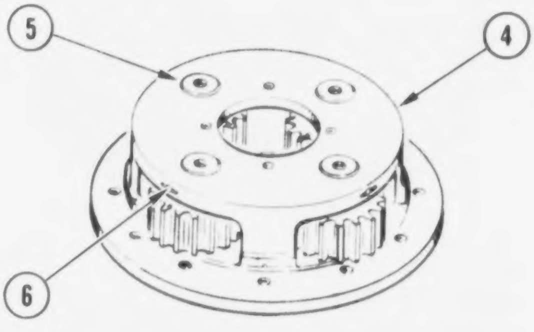
6. CHECK END PLAY OF GEARS (2).
   a. If end play between thrust washers (3) and gears (2) is less than .060 inch (1.52 mm), go to step 7. If not, go to step 9.

7. TURN OUTPUT CARRIER (4) OVER.

8. INSPECT PLANETARY GEAR SPINDLES (5) AND PINS (6).
   a. If all spindles (5) and pins (6) are tight, go to step 11. If not, go to step 9.

9. REPLACE OUTPUT CARRIER ASSEMBLY. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE CARRIER ASSEMBLY TO DEPOT.

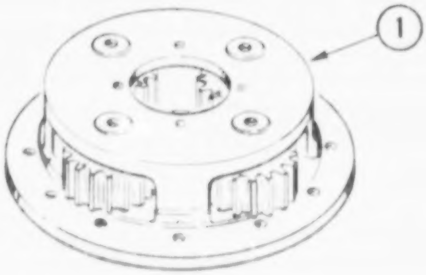
10. EFFORT IS COMPLETE. GO TO END OF TASK.



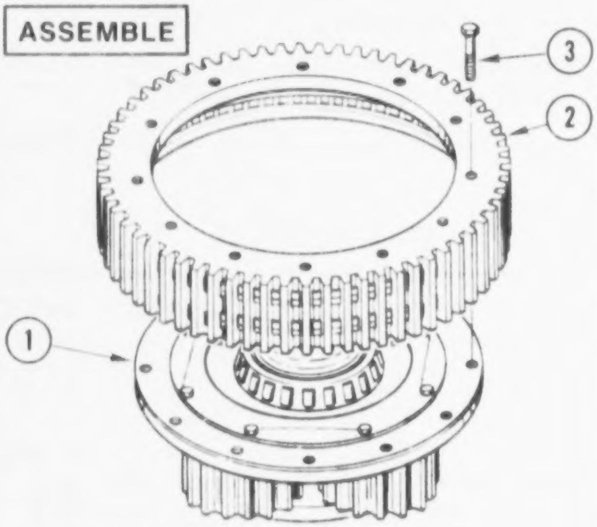
11. CLEAN LEFT-HAND OUTPUT CARRIER ASSEMBLY (1).
    a. Clean assembly and hardware. See page 2-2.

12. INSPECT LEFT-HAND OUTPUT CARRIER ASSEMBLY (1).
    a. Inspect assembly and hardware. See page 2-5.
    b. Replace output carrier assembly (1) if damaged. Record failure on DA FORM 2407 and return defective output carrier assembly to depot.

13. IF LEFT-HAND OUTPUT CARRIER ASSEMBLY (1) WAS REPLACED, GO TO END OF TASK. IF NOT, GO TO STEP 14.



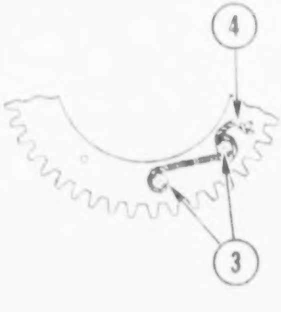
ASSEMBLE



14. POSITION HUB (2) ON OUTPUT CARRIER (1).

15. INSTALL 12 SCREWS (3) IN HUB (2).
    a. Coat threads of 12 screws (3) with sealant compound.
    b. Install 12 screws (3) in hub (2).

16. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 12 SCREWS (3) TO 20-25 ft-lb (3 mkg).



17. INSTALL LOCKWIRE (4).
    a. Using wire-twister pliers, install lockwire (4) through 2 screws (3). Repeat for remaining 10 screws.

END OF TASK

REPAIR LEFT-HAND OUTPUT HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the left-hand output housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inserts wrench — (Item 40, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Lockring drive tool — (Item 45, App C)
- Portable electric drill — (Item 58, App C)
- Screw extractor set — (Item 62, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Socket wrench set — (Item 89, App C)
- Transmission insert repair kit — (Item 103, App C)
- Twist drill set — (Item 105, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)
- Lockring
- Lockring insert

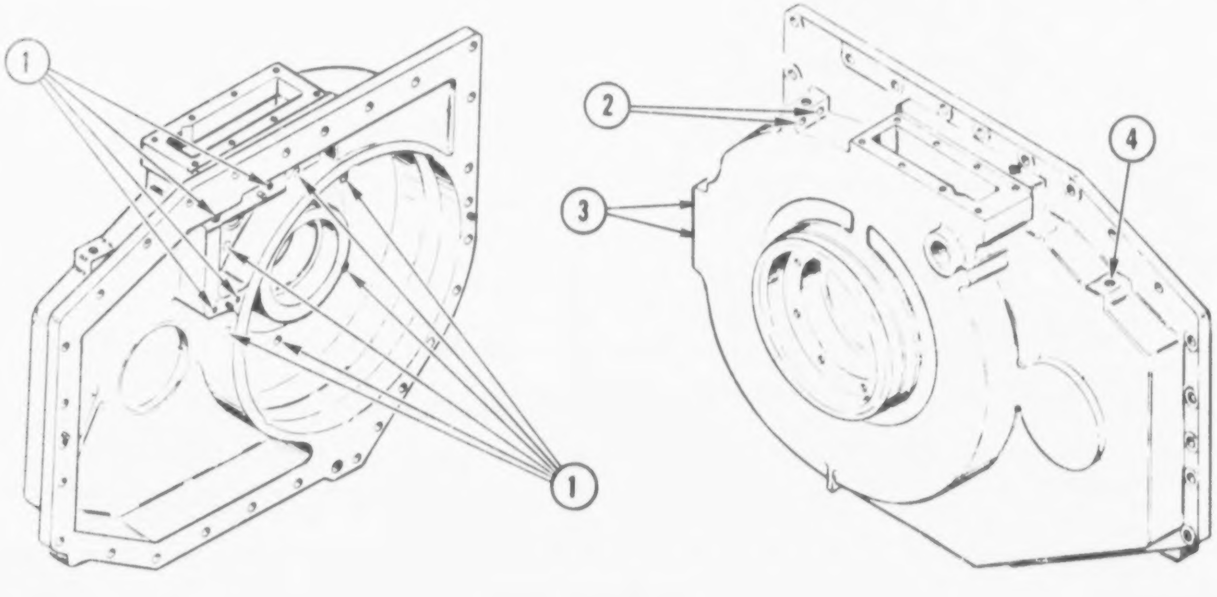
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Left-hand output housing on workbench. See page 4-323.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-13L SR258L	SR25R		SR25T	RZA12788-2 RZA12656-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
	M45932/3-13L SRW258L	SRW25R	SRW25D	SRW25T	RZA12789-2 RZA12791-2	.082-.092 in. (2.08-2.34 mm)	SR25WA	.02-.03 in. (.51-.76 mm)
2	M45932/1-23L SR376L	SR37R		SR37T	RZA12788-4 RZA12656-4	.128-.138 in. (3.25-3.51 mm)	SR37WA	.035-.045 in. (.889-1.14 mm)
	M45932/3-23L SRW376L	SRW37R	SRW37D	SRW37T	RZA12789-4 RZA12791-4	.128-.138 in. (3.25-3.51mm)	SR37WA	.035-.045 in. (.889-1.14 mm)
3	M45932/1-31L SR503L	SR50R		SR50T	RZA12788-6 RZA12656-6	.138-.148 in. (3.51-3.76mm)	SR50WA	.045-.055 in. (1.14-1.40 mm)
	M45932/3-31L SRW503L	SRW50R	SRW50D	SRW50T	RZA12789-6 RZA12791-6	.138-.148 in. (3.51-3.76 mm)	SR50WA	.045-.055 in. (1.14-1.40 mm)

LOCKRING INSERT REPLACEMENT INFORMATION

Index No.	Insert No.	Lockring No.	Screw Extractor No.	Removal Tool No.	Thread Cutting Tap Tool No.	Counter-bore Depth	Installation Depth Below Surface	Lockring Installation Depth Below Surface
4	11628815-1	11628815-2	5120-00-240-5222	5133-00-228-1333	5136-00-580-7342	.156 in. (3.96 mm)	.01-.02 in. (.25-.51 mm)	.005-.006 in. (0.13-0.15 mm)

END OF TASK

REPAIR LEFT-HAND BRAKE ACTUATING PLATE INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the left-hand brake actuating plate. Part or item numbers of tools, kits, and inserts, and working dimensions are given below.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Honing stone — (Item 4B, App B)
- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

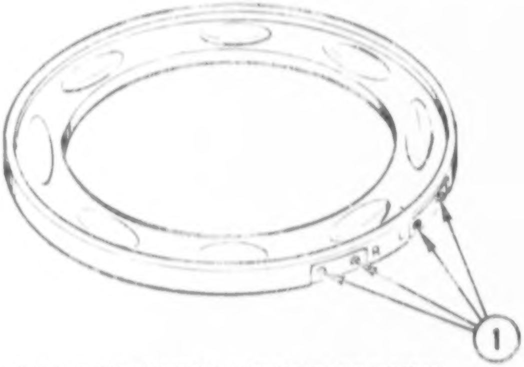
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Brake actuating plate on workbench. See page 4-323.

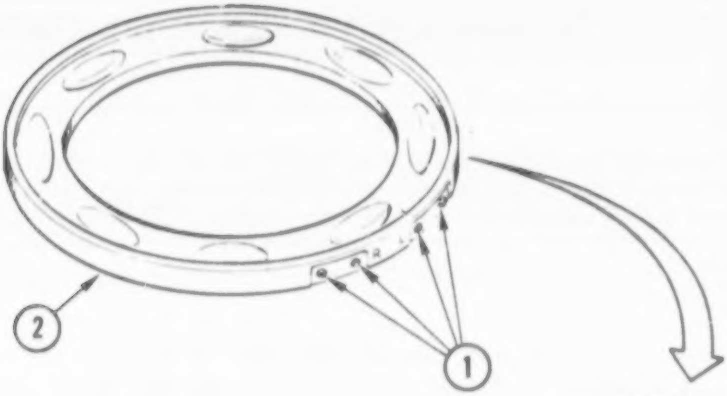
REPAIR



1. INSPECT INSERTS (1). See page 2-5.
2. IF ANY INSERT (1) IS DAMAGED, SEE REPLACE INSERTS, page 2-171. SEE CHART FOR REPLACEMENT INFORMATION.

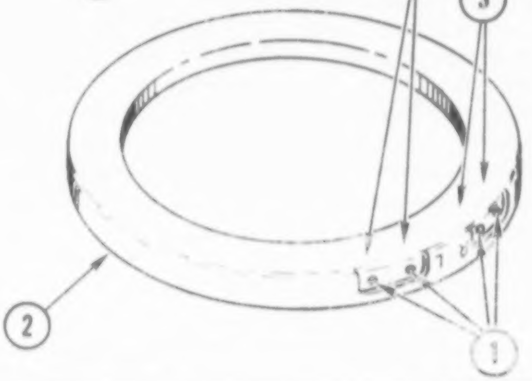
STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-17L SR314L	SR31R		SR31T	RZA12788-3 RZA12656-3	.097-.107 in. (2.46-2.72 mm)	SR31WA	.035-.045 in. (.889-1.14 mm)
	M45932/3-17L SRW314L	SRW31R	SRW31D	SRW31T	RZA12789-3 RZA12791-3	.097-.107 in. (2.46-2.72 mm)	SR31WA	.035-.045 in. (.889-1.14 mm)



3. IF ANY BRAKE ACTUATING PLATE INSERT (1) WAS REPLACED, GO TO STEP 4. IF NOT, GO TO STEP 6.

4. TURN PLATE (2) OVER.
   a. Inspect back of plate (3) where new insert(s) (1) was installed.
   b. If insert(s) (1) caused back of plate (3) to deform, go to step 5. If not, go to step 6.



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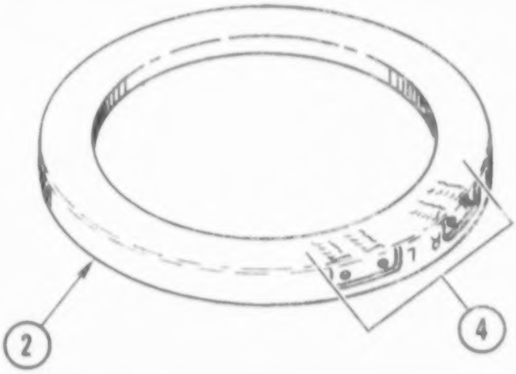
5. HONE RAISED AREA (4) OF PLATE (2).
   a. Using fine honing stone, hone raised area(s) (4) on bottom of plate (2) until surface is flat.

6. CLEAN ALL INSERTS AND RELATED HOUSINGS.
   a. Clean assembly and hardware. See page 2-2.



END OF TASK

REPAIR LEFT-HAND RETAINER PLATE ASSEMBLY INSERT

DESCRIPTION

This task gives the location and size of the insert used in the left-hand retainer plate assembly. Part or item numbers of tools, kits and inserts, and working dimensions are given below. For procedures to remove repair and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C))
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

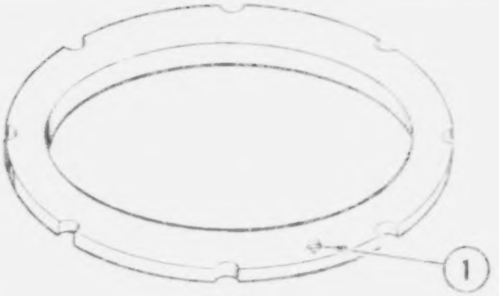
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Left-hand retainer plate assembly on workbench. See page 4-323.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counter-bore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)

END OF TASK

Section X. INPUT BEVEL SPUR GEARSHAFT COUPLING

TASK INDEX

Task Page

Repair Spur Gearshaft Coupling Inserts 4-354

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

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REPAIR SPUR GEARSHAFT COUPLING INSERTS

DESCRIPTION

This task gives the location and part number of helical coil inserts used in the spur gearshaft coupling. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove and install helical coil inserts, refer to Replace Helical Coil Inserts. See page 2-166.

INITIAL SETUP

Tools:

General mechanic's tool kit:
 automotive — (Item 33, App C)
Industrial goggles — (Item 39, App C)
Inside/outside indicator caliper —
 (Item 41, App C)
Micrometer depth gage — (Item 54, App C)
Screw-thread insert kit — (Item 64, App C)
Screw threading set — (Item 65, App C)
Compressed air source, 30 psi
 (207 kPa) maximum

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)

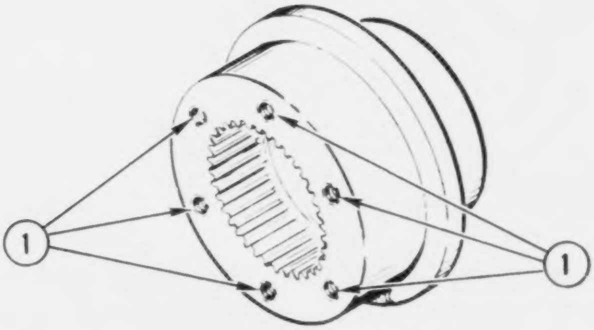
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Spur gearshaft coupling on workbench.
 See page 4-94.

REPAIR



HELICAL COIL INSERT REPLACEMENT INFORMATION

Index No	Insert No.	Insert Thread Size (Inches)	Installation Depth Below Surface
1	MS21209 F4-15	1/4-28	0.24-0.26 in. (6.1-6.6 mm)

END OF TASK

Section XI. POSITIVE CLUTCH

TASK INDEX

Task Page

Replace Positive Clutch 4-356

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE POSITIVE CLUTCH

DESCRIPTION

This task covers: Remove (page 4-356). Install (page 4-357).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

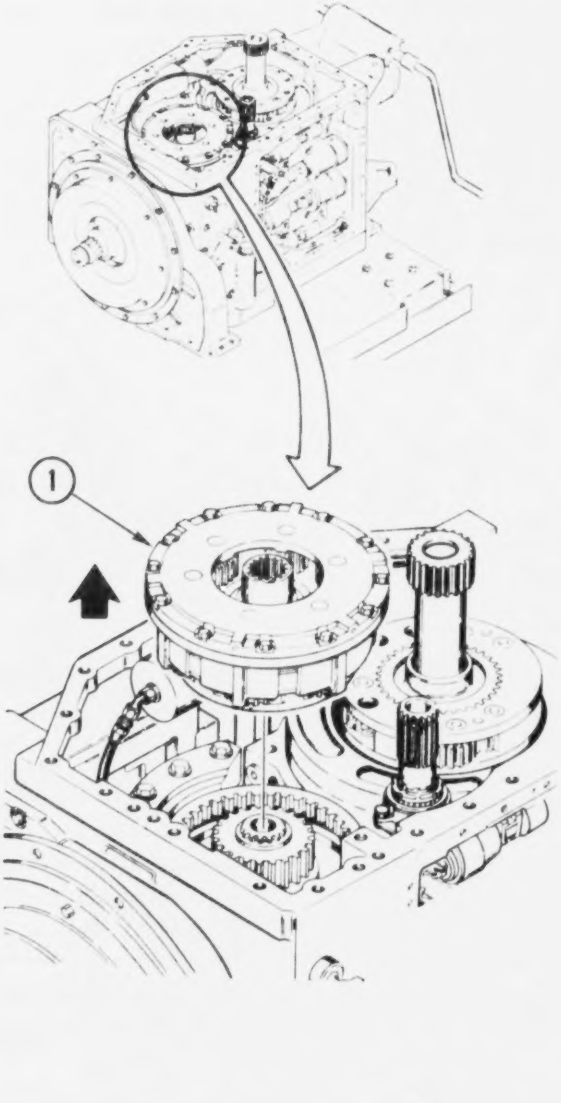
Personnel Required:

Track Veh Rep 63H10

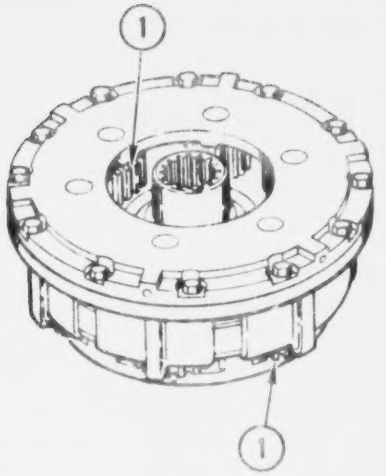
Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

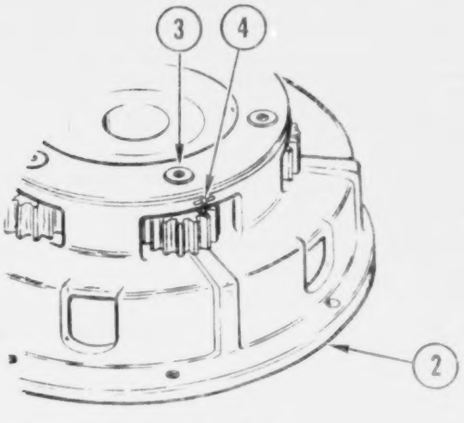
REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. LIFT OUT POSITIVE CLUTCH (1).



5. INSPECT 12 SPUR GEARS (1).
   - a. Inspect 12 gears (1) for damage. See page 2-5.
   - b. If gears (1) are not damaged and rotate freely, go to step 6. If gears are damaged or do not rotate freely, go to step 8.



6. TURN CLUTCH (2) OVER.

7. INSPECT PLANETARY GEAR SPINDLES (3) AND PINS (4).
   - a. If all spindles (3) and pins (4) are tight, go to step 9. If not, go to step 8.

8. REPLACE CLUTCH (2). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE CLUTCH TO DEPOT.

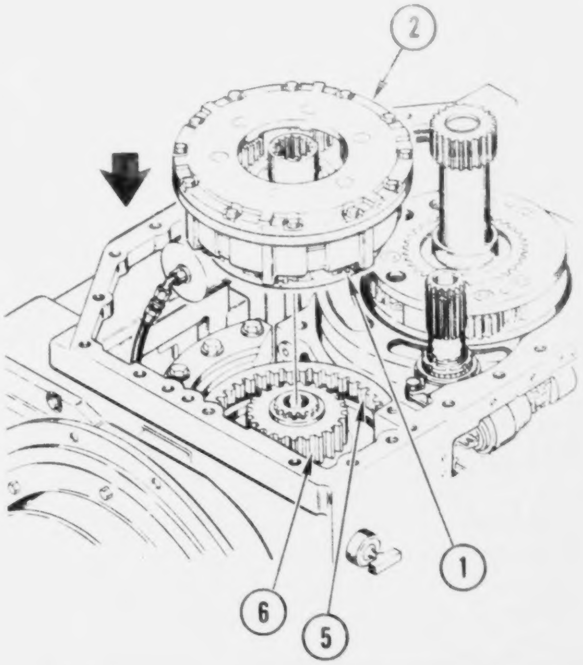
INSTALL

9. INSTALL CLUTCH (2).
   - a. Turn clutch (2) until gears (1) mesh with ring gear (5) and second range sun spur gear (6). Clutch will slide into place.

10. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

11. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

12. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.



END OF TASK

Section XII. LEFT-HAND HYDRAULIC ASSEMBLY

TASK INDEX

Task	Page
Replace Left-Hand Hydraulic Assembly	4-360
Inspect Left-Hand Hydraulic Assembly	4-370

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE LEFT-HAND HYDRAULIC ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-360). Install (page 4-364).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
Fixture removal assembly — (Item 28, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)
Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)
Internal wrench bolt
Preformed packing
Preformed packing (2)
Socket head cap screw
Socket head cap screw (4)

Personnel Required:

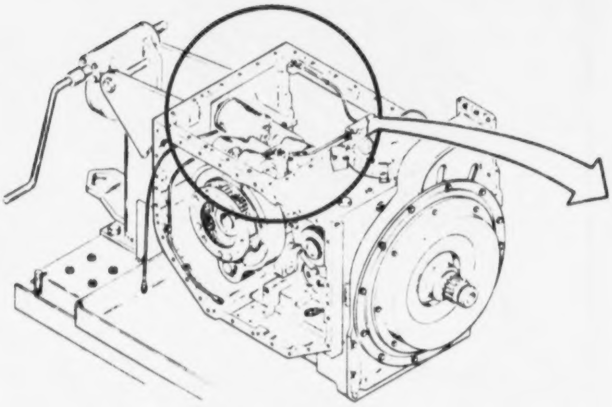
Track Veh Rep 63H10
Helper (H)

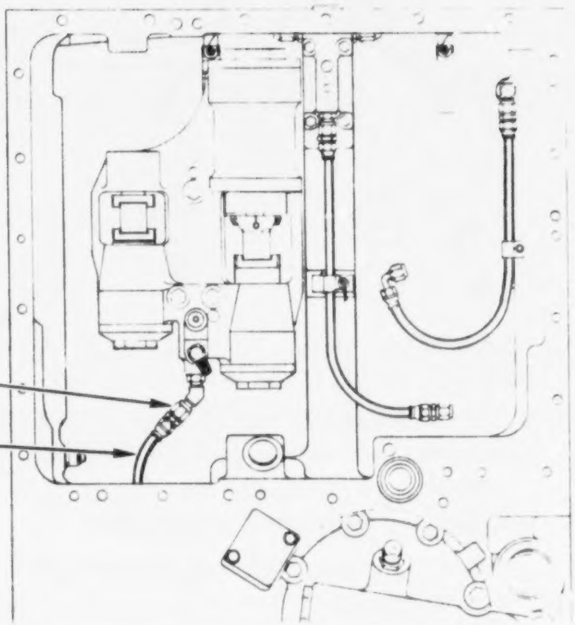
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

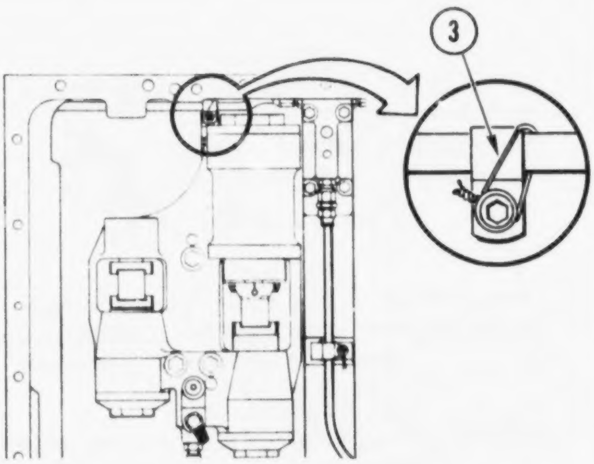
1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
9. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.
10. REMOVE SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.
11. REMOVE RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.



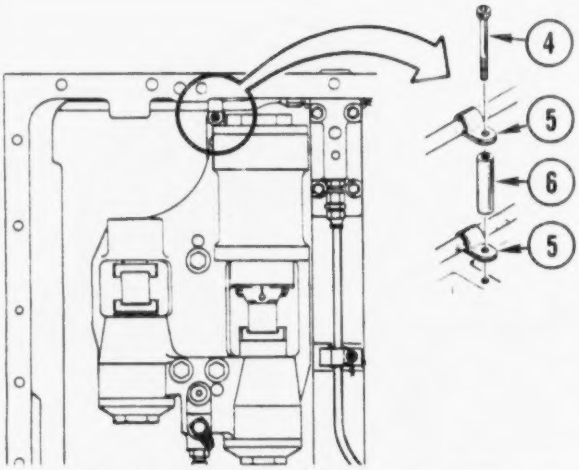


12. DISCONNECT HOSE ASSEMBLY (1) 11629168-9.

    a. Unscrew hose nut (2).



13. USING WIRE-TWISTER PLIERS, REMOVE AND DISCARD LOCKWIRE (3).

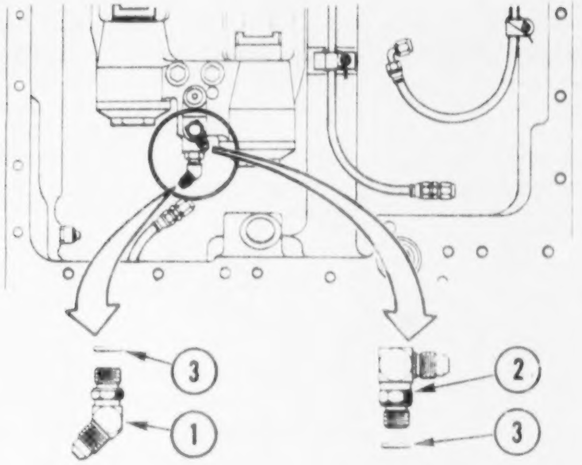


14. REMOVE SCREW (4), TWO CLAMPS (5), AND SLEEVE SPACER (6).

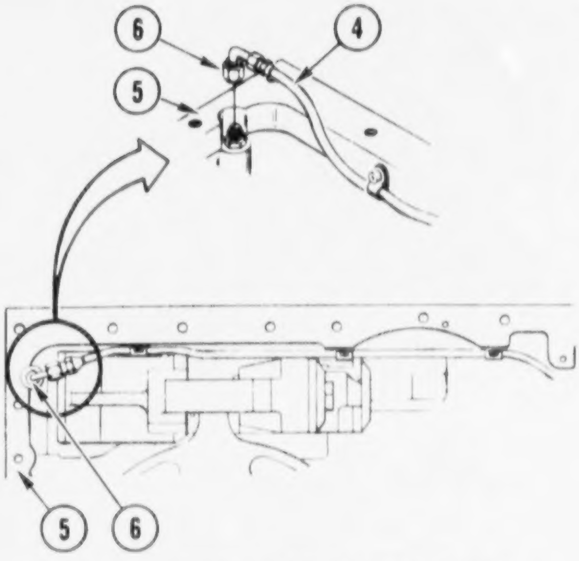
    a. Using 3/8-inch drive ratchet handle with extension and 5/32-inch socket wrench attachment, remove screw (4). Discard screw.

    b. Remove two clamps (5) and sleeve spacer (6).

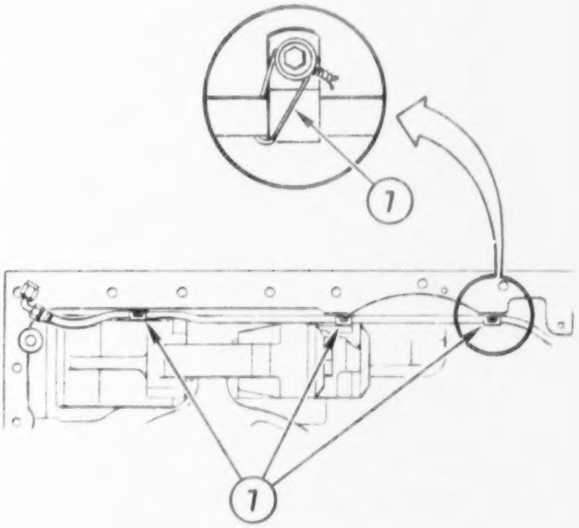
GO TO NEXT PAGE



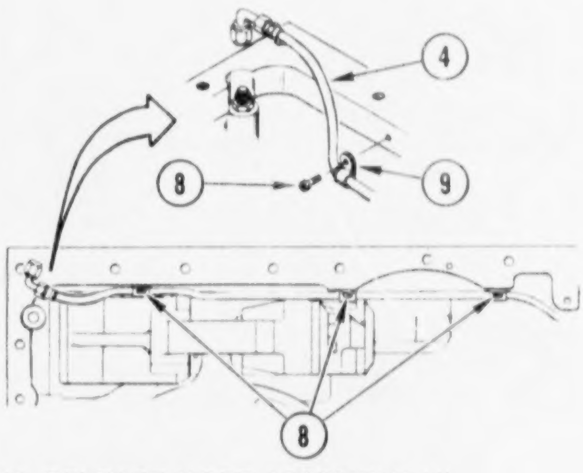
15. REMOVE 45° HOSE TO BOSS ELBOW (1) AND 90° HOSE TO BOSS ELBOW (2).
    a. Note position of two elbows (1) and (2) so that they will be put back the same way.
    b. Unscrew elbows (1) and (2).
    c. Remove and discard two preformed packings (3).



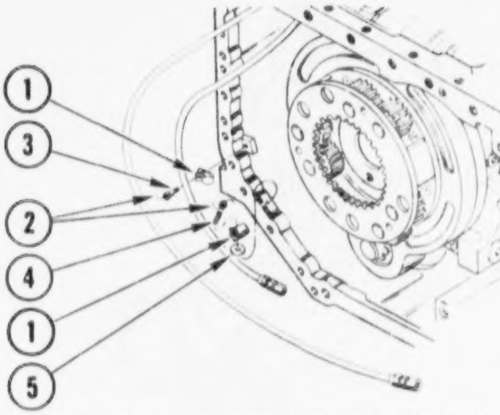
16. DISCONNECT HOSE ASSEMBLY (4) 11628453-3.
    a. Working on left side of transmission (5), unscrew hose nut (6).



17. USING WIRE-TWISTER PLIERS, REMOVE AND DISCARD THREE LOCKWIRES (7).



18. RELEASE HOSE ASSEMBLY (4).
    a. Using 3/8-inch drive ratchet handle with extension and 5/32-inch socket wrench attachment, remove three screws (8) from clamps (9). Discard three screws.
    b. Position hose (4) clear of work area.

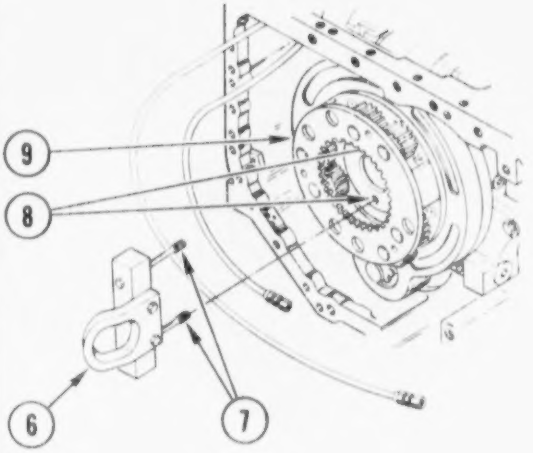


19. REMOVE TWO LOOP CLAMPS (1).

   a. Using wire-twister pliers, remove and discard two lockwires (2).

   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (3), bolt (4), and spacer (5). Discard screw and bolt.

   c. Spread open and pull off two clamps (1).



20. ATTACH FIXTURE REMOVAL ASSEMBLY (6).

   a. Install two screws (7) in screw holes (8) in hydraulic assembly (9).

   b. Tighten two screws (7).

21. POSITION TRANSMISSION LEFT SIDE UP.

WARNING

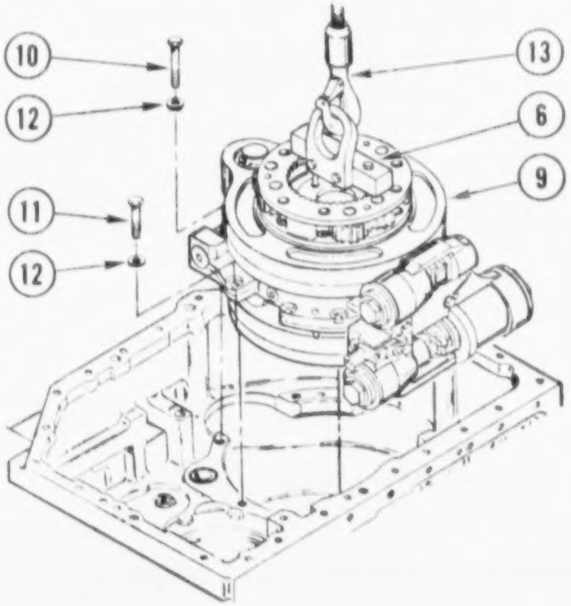
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

CAUTION

Do not contact hoses with hydraulic assembly when lifting from transmission. Damage to equipment can occur.

NOTE

Race may be lifted by hand for removing two screws that are close to main housing.



22. REPAIRER AND HELPER REMOVE LEFT-HAND HYDRAULIC ASSEMBLY (9).

   a. Remove one long bolt (10), seven short bolts (11), and eight washers (12).

   b. Attach lifting device (13) to removal assembly (6) and lift out hydraulic assembly (9).

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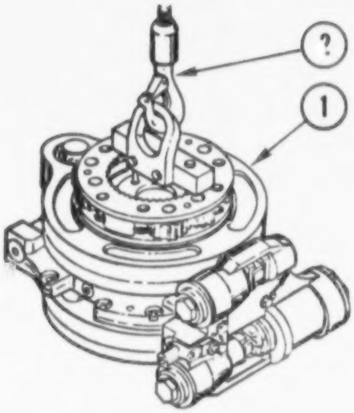
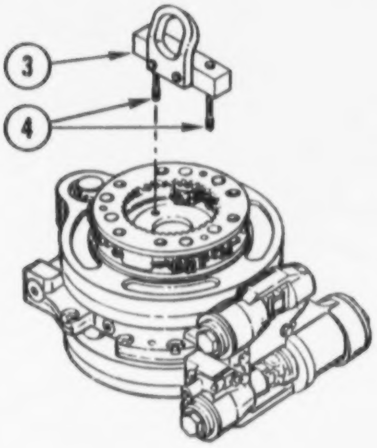
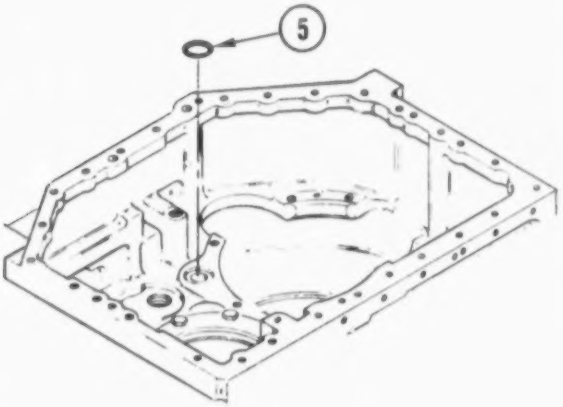


23. PLACE HYDRAULIC ASSEMBLY (1) ON WORK SURFACE.
    a. Lower hydraulic assembly (1) to work surface.
    b. Remove lifting device (2).



24. REMOVE REMOVAL ASSEMBLY (3).
    a. Unscrew two screws (4) and remove removal assembly (3).

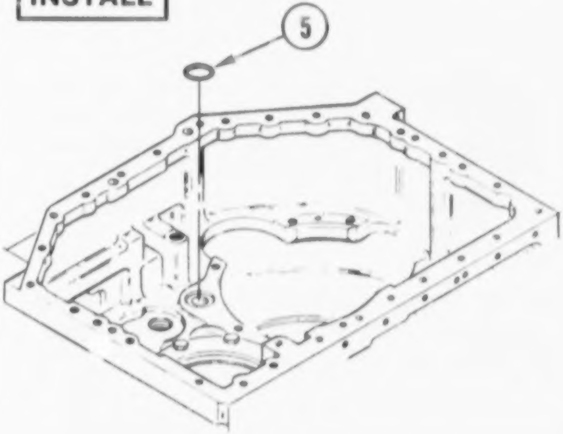
24.1 INSPECT HYDRAULIC ASSEMBLY (1). See task INSPECT LEFT-HAND HYDRAULIC ASSEMBLY, page 4-370.



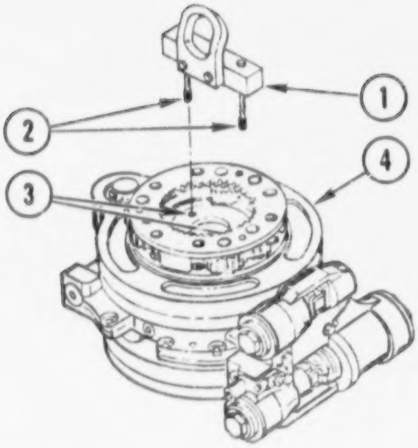
25. REMOVE AND DISCARD PREFORMED PACKING (5).

26. INSPECT MAIN HOUSING INSERTS.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

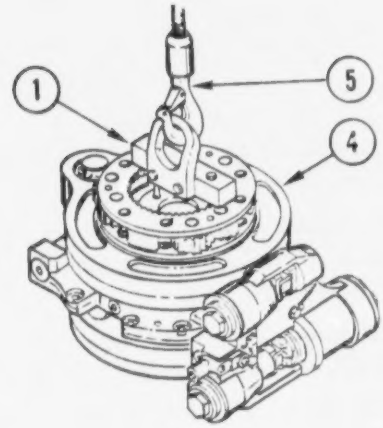
INSTALL



27. INSTALL NEW PREFORMED PACKING (5).
    a. Coat new preformed packing (5) with transmission oil. Put new preformed packing in place.



28. ATTACH REMOVAL ASSEMBLY (1).
    a. Install two screws (2) in screw holes (3) in hydraulic assembly (4).
    b. Tighten two screws (2).

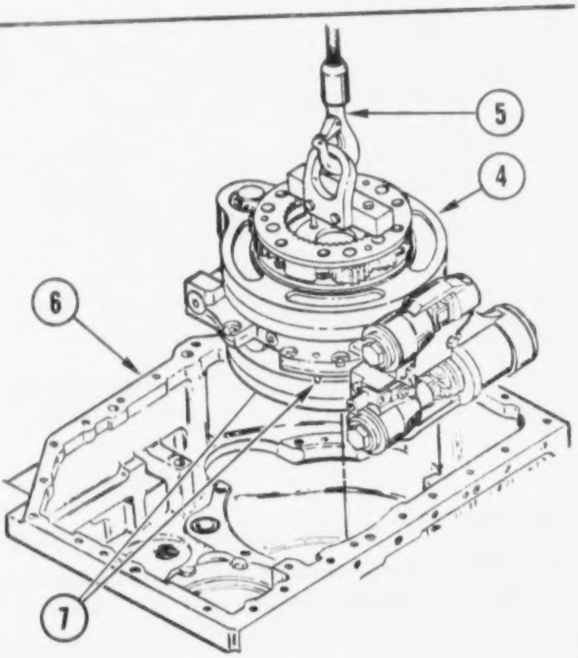


WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

29. LIFT HYDRAULIC ASSEMBLY (4) OFF WORK SURFACE.
    a. Attach lifting device (5) to removal assembly (1).
    b. Lift hydraulic assembly (4) off work surface.

CAUTION
Do not contact hoses with hydraulic assembly when lowering into place. Damage to equipment can occur.

30. REPAIRER AND HELPER INSTALL HYDRAULIC ASSEMBLY (4).
    a. Lower hydraulic assembly (4) into left side of transmission housing (6).
    b. Seat two pins (7) by moving hydraulic assembly (4) back and forth.
    c. Remove lifting device (5).



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NOTE

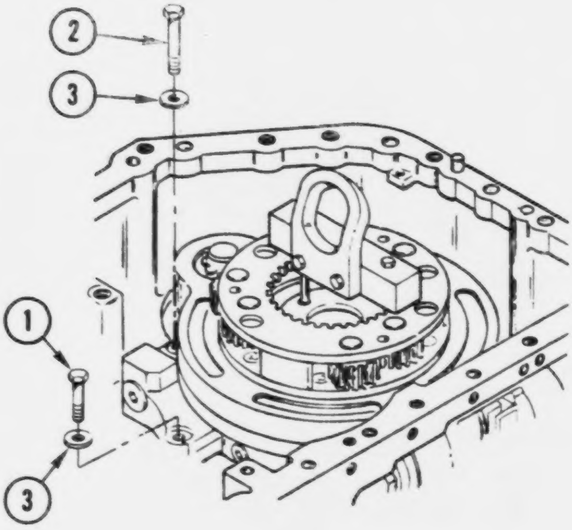
Race may be lifted by hand for installing two bolts that are close to main housing.

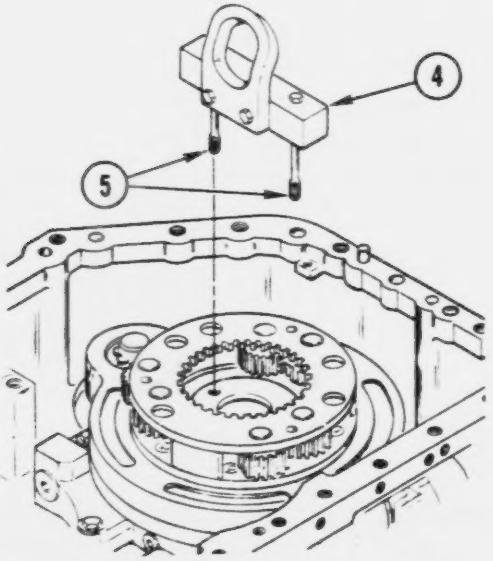
31. INSTALL SEVEN SHORT BOLTS (1) AND ONE LONG BOLT (2) WITH EIGHT WASHERS (3).

    a. Coat threads of eight bolts (1) and (2) with sealant compound.

    b. Install seven short bolts (1), one long bolt (2), and eight washers (3).

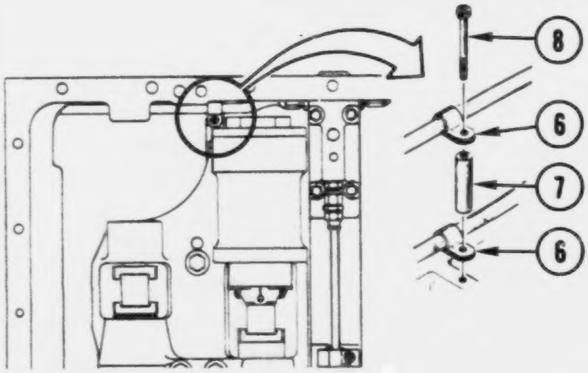
32. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SEVEN SHORT BOLTS (1) AND ONE LONG BOLT (2) TO 85-95 ft-lb (12-13 mkg).





33. REMOVE REMOVAL ASSEMBLY (4).

    a. Unscrew two screws (5) and remove removal assembly (4).

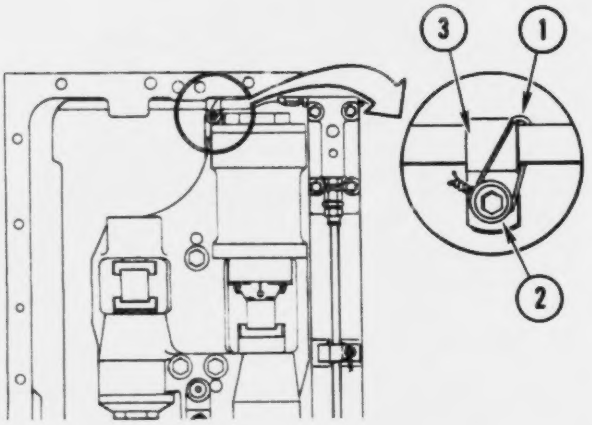


34. POSITION TRANSMISSION CONTROLLER SIDE UP.

35. SECURE TWO HOSE CLAMPS (6).

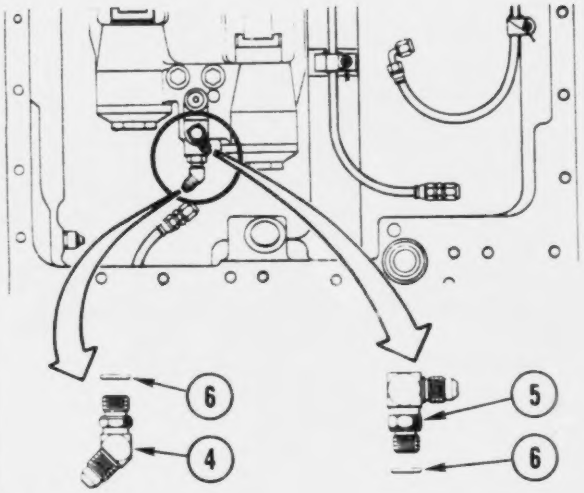
    a. Install spacer (7). Using 3/8-inch drive ratchet handle with extension and 5/32-inch socket wrench attachment, install new screw (8) through two clamps (6) and spacer (7).

36. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (8) TO 35-45 in-lb (40-52 cmkg).



37. INSTALL NEW LOCKWIRE (1).

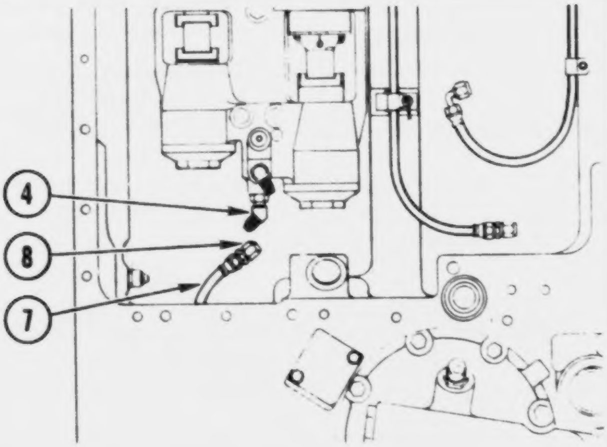
   a. Using wire-twister pliers, install lockwire (1) through screw (2) and around hose and clamp (3).



38. INSTALL 45° ELBOW (4) AND 90° ELBOW (5).

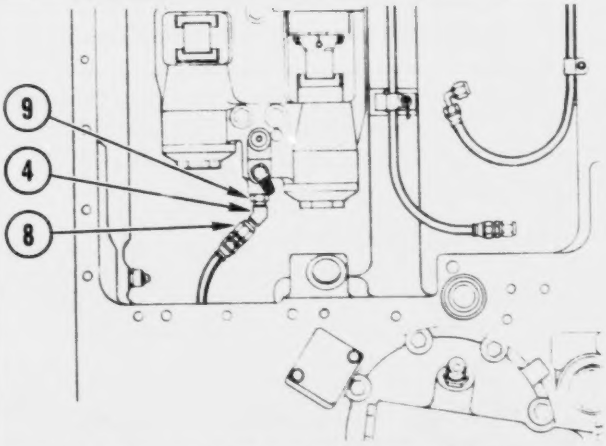
   a. Coat two new preformed packings (6) with transmission oil. Install packing on each elbow (4) and (5).

   b. Screw in elbows (4) and (5) to position noted during removal.



39. CONNECT HOSE ASSEMBLY (7).

   a. Screw hose nut (8) onto 45° elbow (4).



40. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (9) ON ELBOW (4) TO 125-135 in-lb (144-155 cmkg).

41. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (8) TO 125-135 in-lb (144-155 cmkg).

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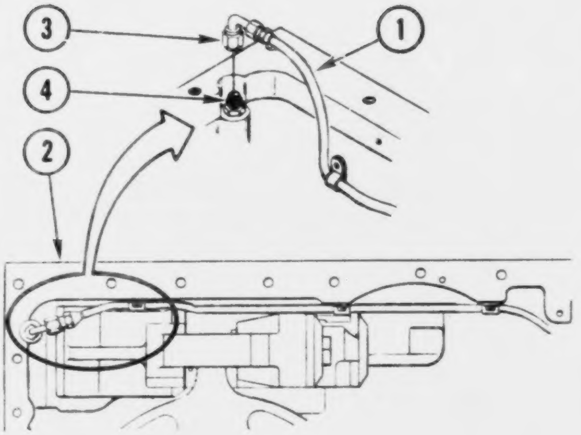
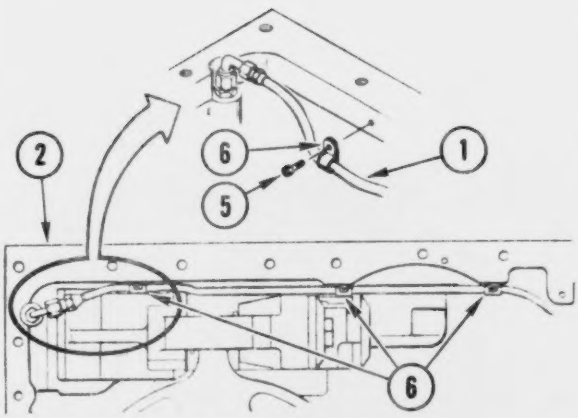


CAUTION

Do not allow hose assemblies to touch. Damage to equipment can occur.

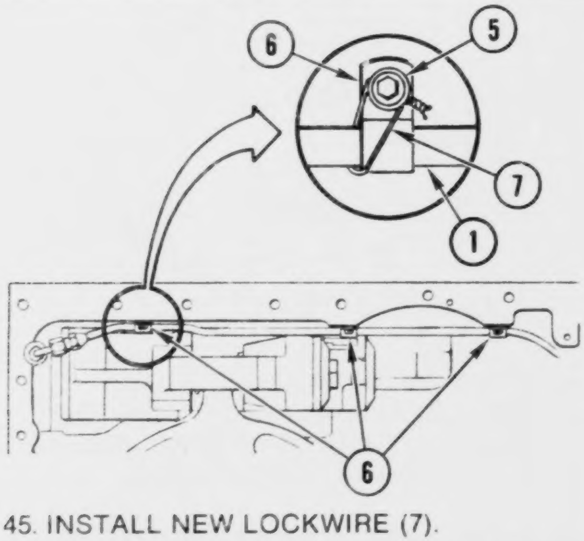
Hose assemblies must be positioned without kinks or unnecessary bends. Damage to equipment can occur.

42. CONNECT HOSE ASSEMBLY (1).
    a. Working on left side of housing (2), screw hose nut (3) onto adapter (4).

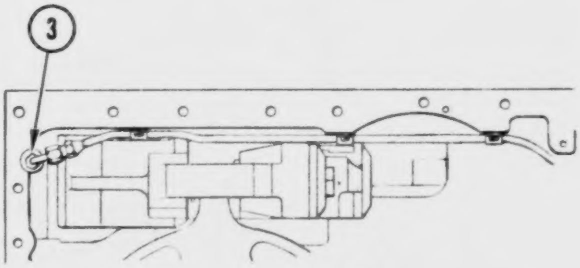


43. SECURE HOSE ASSEMBLY (1).
    a. Position hose assembly (1) as straight as possible along housing (2).
    b. Using 3/8-inch drive ratchet handle with extension and 5/32-inch socket wrench attachment, install three new screws (5) through three clamps (6).

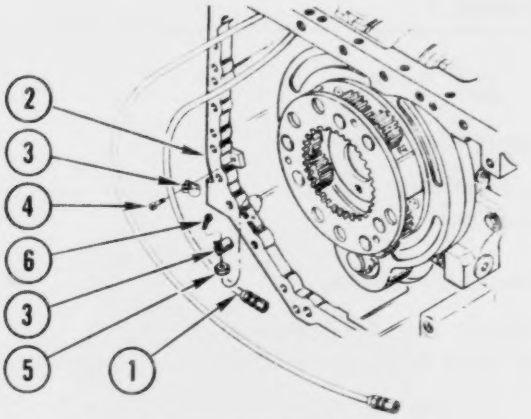
44. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE THREE SCREWS (5) TO 35-45 in-lb (40-52 cmkg).



45. INSTALL NEW LOCKWIRE (7).
    a. Using wire-twister pliers, install lockwire through three screws (5), around hose (1), and three clamps (6).



46. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (3) TO 125-135 in-lb (144-155 cmkg).

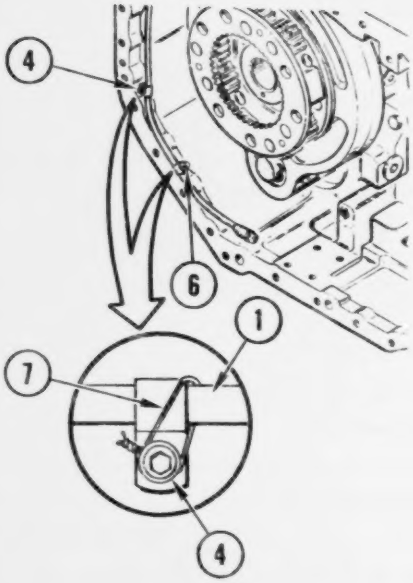


47. SECURE HOSE ASSEMBLY (1).

    a. Attach hose (1) to lower transmission housing (2) with two clamps (3).

    b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new short screw (4), spacer (5), and new bolt (6).

48. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (4) AND BOLT (6) TO 35-45 in-lb (40-52 cmkg).



49. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (7) THROUGH SCREW (4) AND AROUND HOSE (1). REPEAT FOR BOLT (6).

50. INSTALL RIGHT-HAND HYDRAULIC ASSEMBLY. See task REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-378.

51. INSTALL SECOND RANGE BRAKE ASSEMBLIES. See task REPLACE SECOND RANGE BRAKE ASSEMBLIES, page 4-432.

52. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

53. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

54. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

55. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

56. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

57. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

58. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

59. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

60. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

INSPECT LEFT-HAND HYDRAULIC ASSEMBLY

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment —
(Item 85, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Preformed packing

Personnel Required:

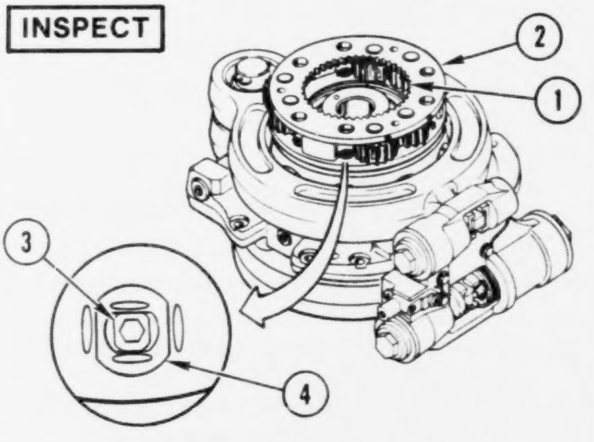
Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

Hydraulic assembly on workbench.
See page 4-360. (See Note)

NOTE
The left-hand hydraulic assembly can be inspected while on transmission or on the workbench.

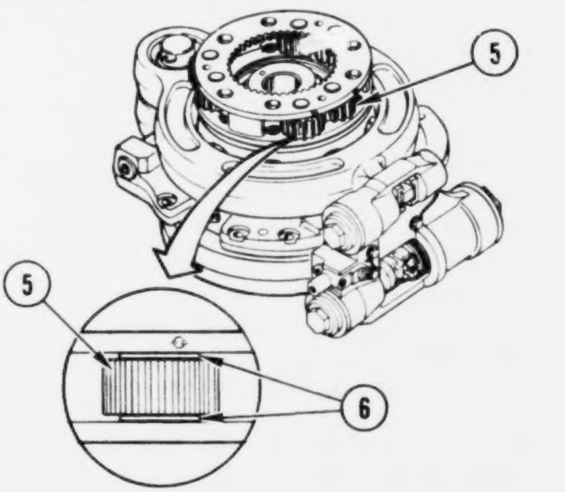
INSPECT



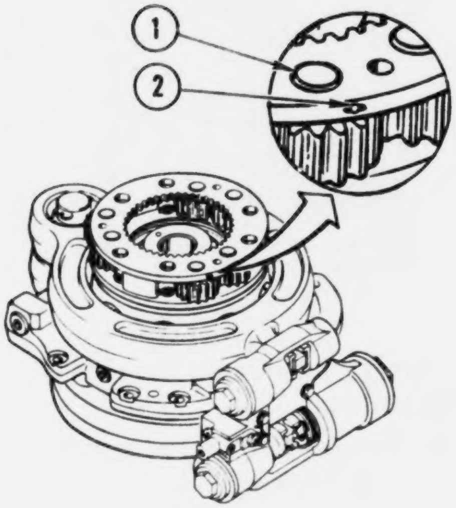
1. INSPECT SPLINED TEETH (1) ON DIFFERENTIAL CARRIER (2).
   a. If teeth (1) are not damaged, go to step 2. If teeth (1) are damaged, go to step 39.

CAUTION
Tools must not be used to inspect tightness of parts. Staking of bushings can be damaged.

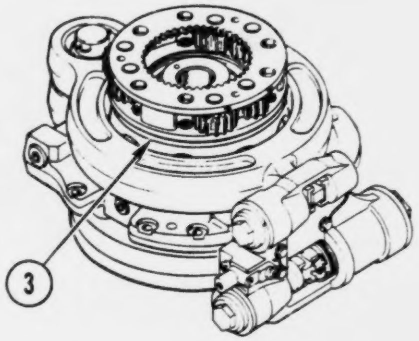
2. INSPECT SIX SCREWS (3) AND STAKED BUSHINGS (4).
   a. If screws (3) and bushings (4) are tight, go to step 3. If screws or bushings are loose or missing, go to step 39.



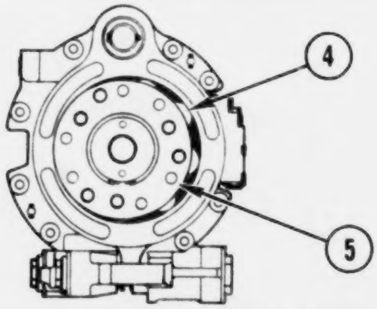
3. INSPECT SIX DIFFERENTIAL CARRIER GEARS (5).
   a. Inspect gears (5) for damage. See page 2-5.
   b. If gears (5) are not damaged and rotate freely, go to step 4. If gears are damaged or do not rotate freely, go to step 39.
4. CHECK END PLAY OF GEARS (5).
   a. If end play between washers (6) and gears (5) is less than .060 inch (1.5 mm), go to step 5. If not, go to step 39.



5. INSPECT SPINDLES (1) AND PINS (2).
   a. If all spindles (1) and pins (2) are tight, go to step 6. If not, go to step 39.

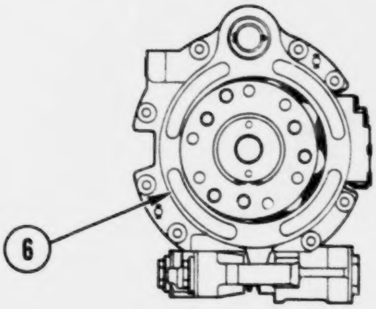


6. INSPECT OUTER TRANSMISSION CYLINDER BLOCK (3).
   a. Rotate cylinder block (3) slowly.
   b. If cylinder block (3) rotates freely, go to step 7. If not, go to step 39.



7. CHECK THAT NINE PISTON BALLS (4) MOVE FREELY.
   a. Rotate cylinder block (5) slowly.
   b. If all piston balls (4) move freely in and out of cylinder block (5), go to step 8. If not, go to step 39.

8. INSPECT PISTON BALLS (4).
   a. Inspect piston balls (4) for damage. See page 2-5.
   b. If no piston balls (4) are damaged, go to step 9. If any piston ball is damaged, go to step 39.



9. INSPECT OUTER HYDRAULIC MOTOR RACE (6).
   a. Inspect outer race (6) for damage. See page 2-5.
   b. If race (6) is not damaged, go to step 10. If race is damaged, go to step 39.

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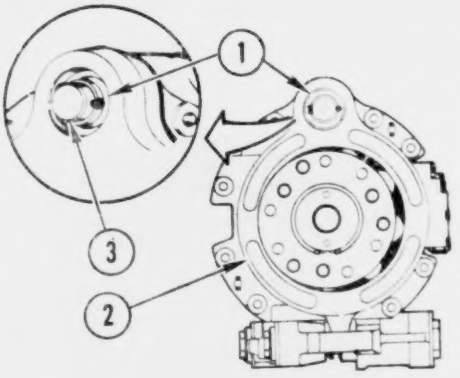
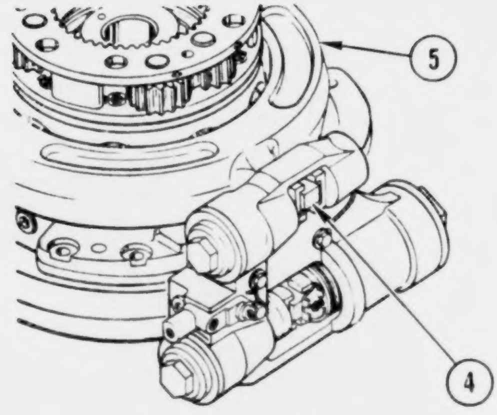
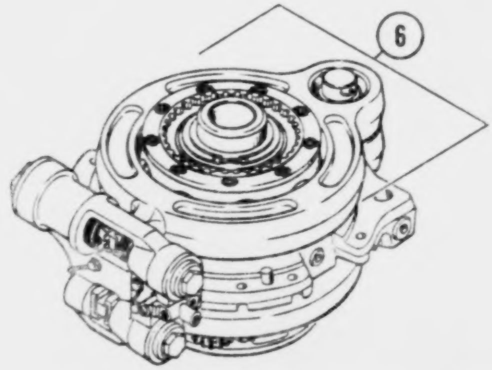


10. CHECK PINTLE PIVOT POINT (1) ON OUTER RACE (2).
    - a. Rock race (2) back and forth.
    - b. If race (2) rocks freely, go to step 11. If race binds on pintle pin (3), go to step 39.



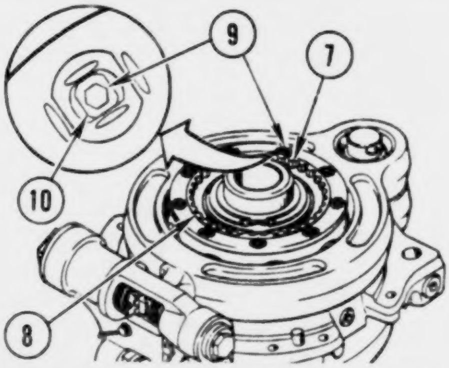
11. INSPECT TANG (4) ON OUTER RACE (5).
    - a. Inspect tang (4) for damage. See page 2-5.
    - b. If tang (4) is not damaged, go to step 12. If tang is damaged, go to step 39.



WARNING

Hydraulic assembly is heavy and could fall and injure you or other personnel.

12. REPAIRER AND HELPER TURN HYDRAULIC ASSEMBLY SO THAT INNER HYDRAULIC UNIT (6) FACES UP.

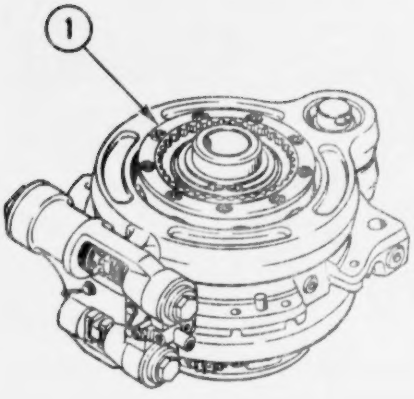


13. INSPECT SPLINED TEETH (7) ON INNER COUPLING (8).
    - a. If teeth (7) are not damaged, go to step 14. If teeth are damaged, go to step 39.

CAUTION

Tools must not be used to inspect tightness of parts. Staking of bushings can be damaged.

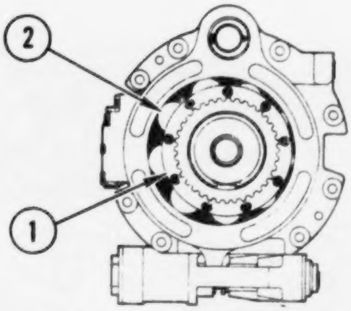
14. INSPECT NINE SCREWS (9) AND STAKED BUSHINGS (10).
    - a. If screws (9) and bushings (10) are tight, go to step 15. If screws or bushings are loose or missing, go to step 39.



15. INSPECT INNER TRANSMISSION CYLINDER BLOCK (1).

    a. Rotate cylinder block (1) slowly.

    b. If cylinder block (1) rotates freely, go to step 16. If not, go to step 39.



16. CHECK THAT NINE PISTON BALLS (2) MOVE FREELY.

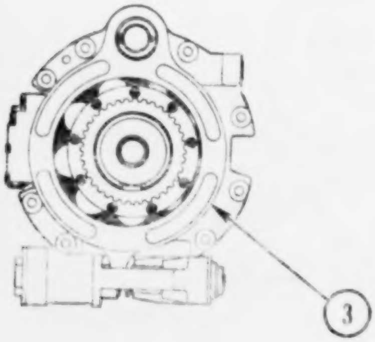
    a. Rotate cylinder block (1) slowly.

    b. If all piston balls (2) move freely in and out of cylinder block (1), go to step 17. If not, go to step 39.

17. INSPECT PISTON BALLS (2).

    a. Inspect piston balls (2) for damage. See page 2-5.

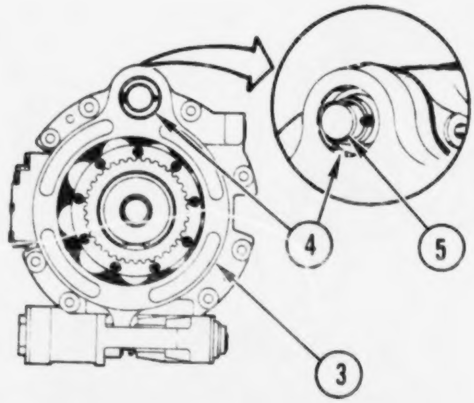
    b. If no piston balls (2) are damaged, go to step 18. If any piston ball is damaged, go to step 39.



18. INSPECT INNER HYDRAULIC MOTOR RACE (3).

    a. Inspect inner race (3) for damage. See page 2-5.

    b. If race (3) is not damaged, go to step 19. If race is damaged, go to step 39.



19. CHECK PINTLE PIVOT POINT (4) ON INNER RACE (3).

    a. Rock race (3) back and forth.

    b. If race (3) rocks freely, go to step 20. If race binds on pintle pin (5), go to step 39.

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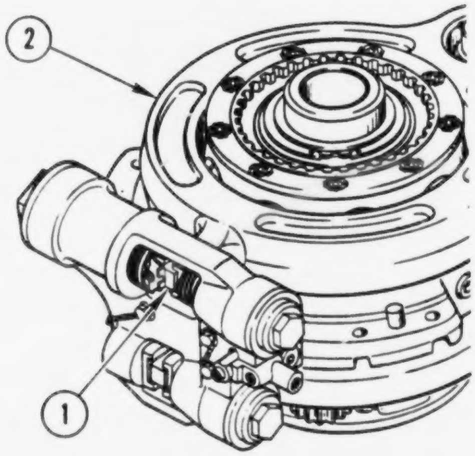
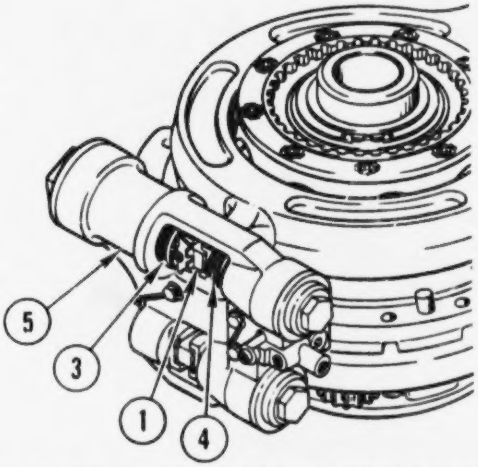
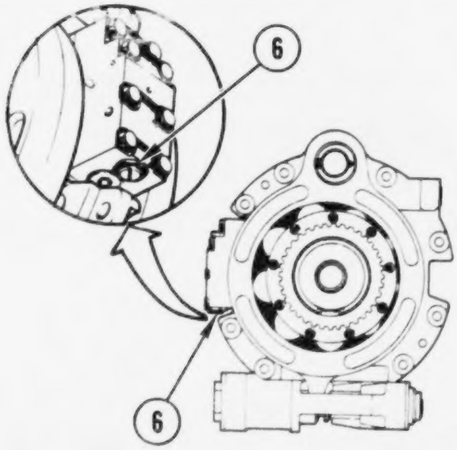


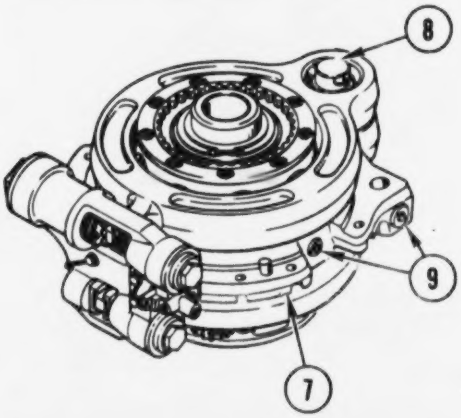
20. INSPECT TANG (1) ON INNER RACE (2).
    a. Inspect tang (1) for damage. See page 2-5.
    b. If tang (1) is not damaged, go to step 21. If tang is damaged, go to step 39.



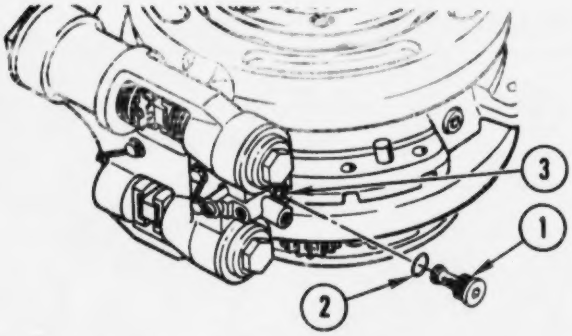
21. CHECK ACTUATOR PISTON ASSEMBLY (3) AND ACTUATOR PISTON (4).
    a. Move tang (1) back and forth by pressing piston (3) into housing (5) with finger and releasing.
    b. If tang (1) moves freely and pistons (3) and (4) move smoothly back and forth, go to step 22.
    c. If tang (1) does not return smoothly to center position with pistons (3) and (4) resting against tang, go to step 39.



22. INSPECT PLAIN NUT (6).
    a. If nut (6) is tight, go to step 23. If nut is loose or missing, go to step 39.

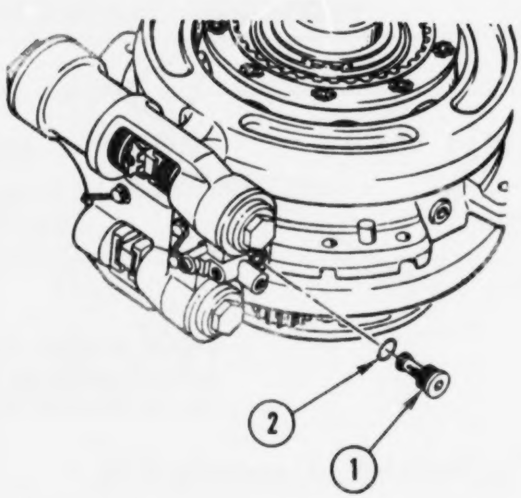


23. INSPECT PINTLE ASSEMBLY (7).
    a. If pintle assembly (7) and pin (8) are not damaged and plugs (9) are installed, go to step 24.
    b. If pintle assembly (7) or pin (8) is damaged or plugs (9) are missing, go to step 39.



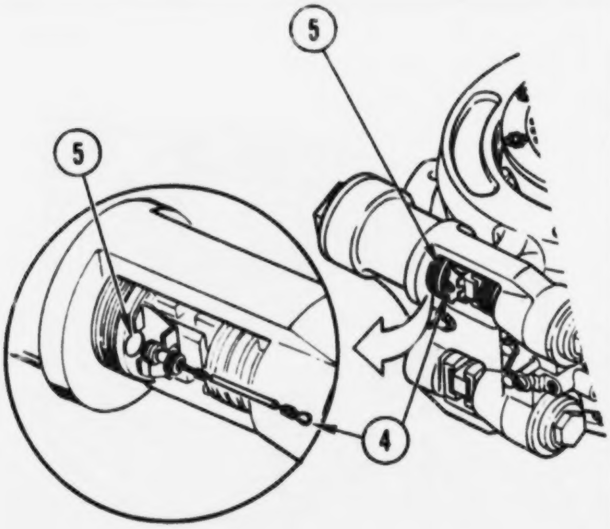
24. REMOVE PRESSURE FLUID FILTER (1).
    a. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, remove filter (1).
    b. Remove preformed packing (2).

25. INSPECT FILTER (1) AND FILTER CAVITY (3).
    a. If metal chips are found, go to step 26. If not, discard packing (2) and go to step 28.

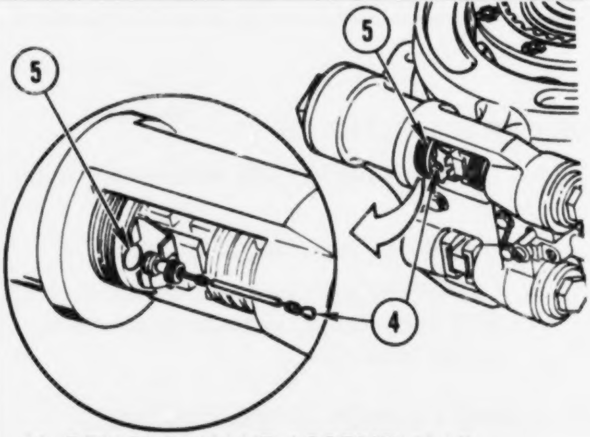


26. INSTALL FILTER (1).
    a. Install packing (2) on filter (1).
    b. Install filter (1).
    c. Tighten filter (1).

27. GO TO STEP 39.



28. CHECK ACTUATOR VALVE ASSEMBLY (4).
    a. Move valve assembly (4) in and out of piston (5).
    b. If valve assembly (4) binds, go to step 29. If not, go to step 32.



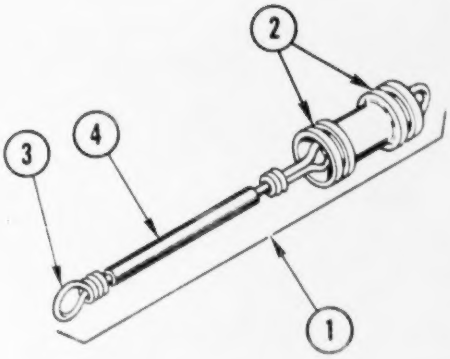
29. REMOVE VALVE ASSEMBLY (4).
    a. Carefully pull valve assembly (4) straight out of hole in piston (5).

30. REPLACE VALVE ASSEMBLY (4).

31. GO TO STEP 34.

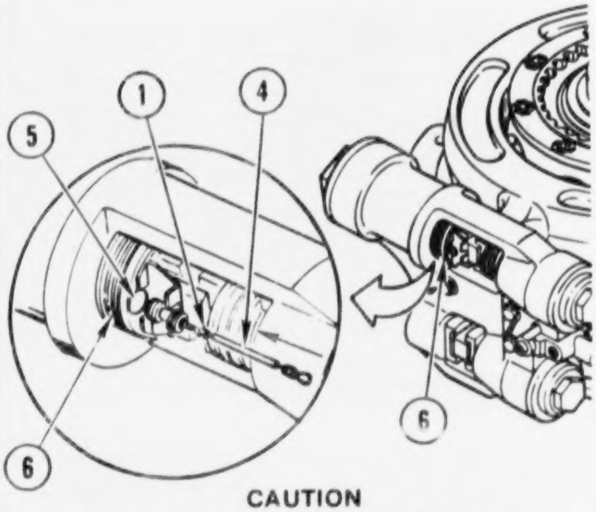
32. REMOVE VALVE ASSEMBLY (4).
    a. Carefully pull valve assembly (4) straight out of hole in piston (5).

GO TO NEXT PAGE



33. INSPECT VALVE ASSEMBLY (1).
    a. Replace valve assembly (1) if valve lands (2), eye (3), or tube (4) are damaged.

34. CLEAN LEFT-HAND HYDRAULIC ASSEMBLY.
    a. Clean assembly and piece parts. See page 2-2.



CAUTION

Do not bend tube when installing valve assembly. Valve assembly can be damaged.

35. INSTALL VALVE ASSEMBLY (1).
    a. Coat valve assembly (1) with transmission oil.
    b. Carefully slide valve assembly (1) into hole (5) in piston (6). Do not bend tube (4).

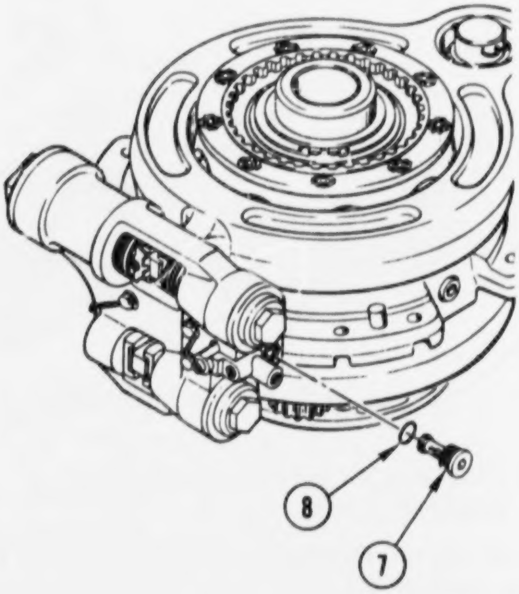
---

36. INSTALL FILTER (7).
    a. Coat new packing (8) with transmission oil.
    b. Install new packing (8) on filter (7).
    c. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, install filter (7).

37. USING 1/2-INCH DRIVE TORQUE WRENCH, 1/2-INCH TO 3/8-INCH ADAPTER, AND 5/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE FILTER (7) TO 40-45 ft-lb (6 mkg).

38. GO TO END OF TASK.

39. REPLACE LEFT-HAND HYDRAULIC ASSEMBLY.



END OF TASK

Section XIII. RIGHT-HAND HYDRAULIC ASSEMBLY

TASK INDEX

Task	Page
Replace Right-Hand Hydraulic Assembly	4-378
Inspect Right-Hand Hydraulic Assembly	4-389

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-378). Install (page 4-383).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing installer — (Item 13, App C)
Crowfoot attachment — (Item 20, App C)
Fixture removal assembly — (Item 28, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Micrometer caliper set — (Item 52, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)
Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)
Preformed packing
Preformed packing (2)
Socket head cap screw

Personnel Required:

Track Veh Rep 63H10
Helper (H)

References:

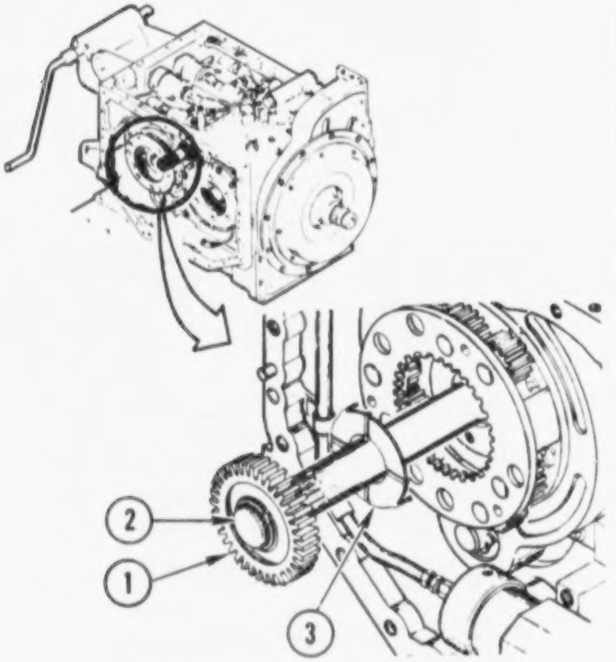
TM 9-214

Equipment Conditions:

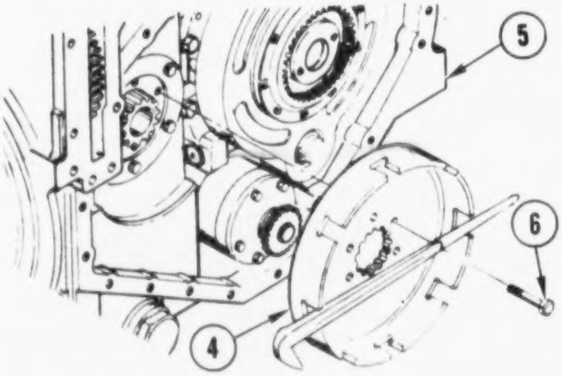
Transmission mounted on tip-over stand. See page 2-144.

REMOVE

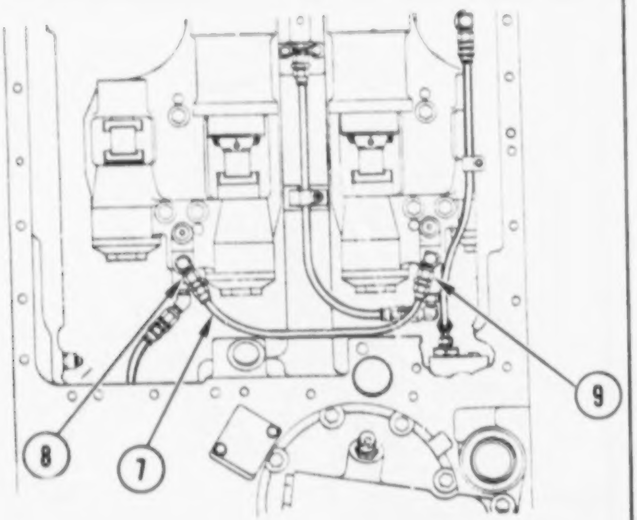
1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.



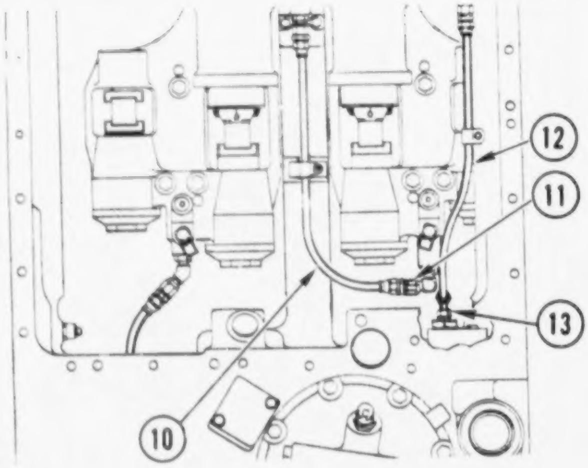
9. REMOVE SPUR GEAR (1) WITH STRAIGHT SHAFT (2) AND THRUST WASHER BEARING (3).



10. REMOVE THIRD RANGE CLUTCH HOUSING (4).
    a. (H) Working on right side of transmission housing (5), use pry bar to hold clutch housing (4) from turning.
    b. Remove six screws (6) and take off clutch housing (4).



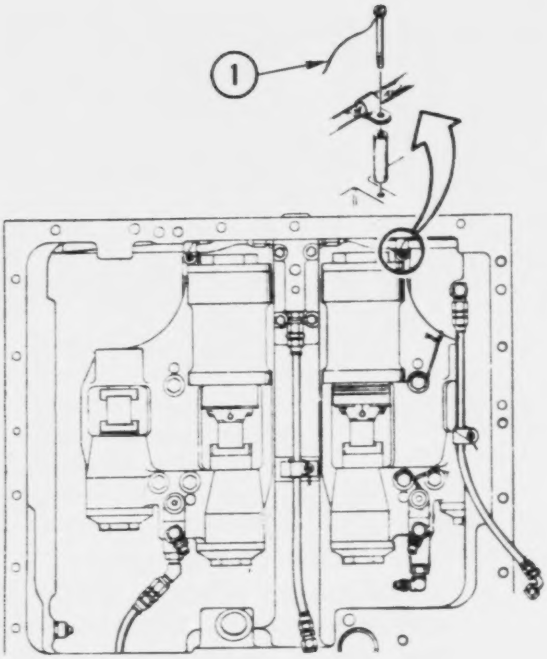
11. REMOVE HOSE ASSEMBLY 11629168-2 (7).
    a. Unscrew hose nut (8).
    b. Unscrew hose nut (9) and remove hose assembly (7).



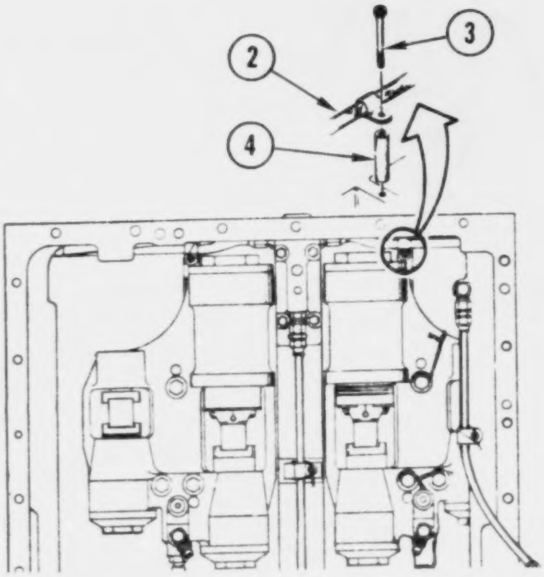
12. DISCONNECT HOSE ASSEMBLY 11629168-7 (10).
    a. Unscrew hose nut (11).

13. DISCONNECT HOSE ASSEMBLY 11628453-7 (12).
    a. Unscrew hose nut (13).

GO TO NEXT PAGE

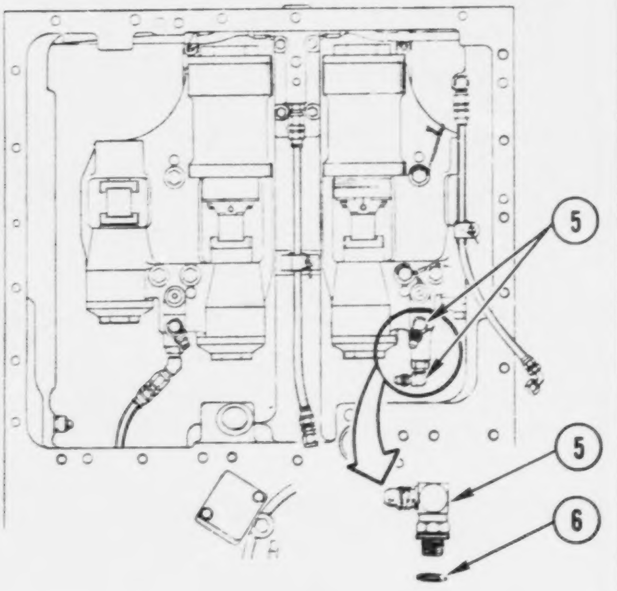


14. USING WIRE-TWISTER PLIERS, REMOVE AND DISCARD LOCKWIRE (1).

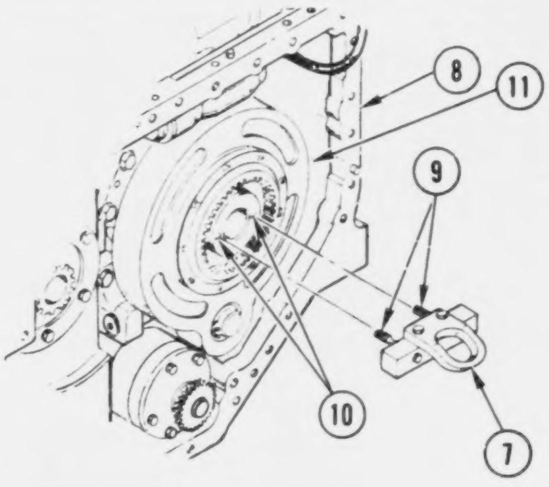


15. RELEASE HOSE ASSEMBLY (2).

   a. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove screw (3) and spacer (4). Discard screw.



16. REMOVE TWO HOSE TO BOSS ELBOWS (5) AND PREFORMED PACKINGS (6). DISCARD PACKINGS.



17. ATTACH FIXTURE REMOVAL ASSEMBLY (7).

   a. Working on right side of transmission (8) attach fixture assemby (7).

   b. Install two screws (9) in screw holes (10) in hydraulic assembly (11).

   c. Tighten two screws (9).

18. POSITION TRANSMISSION (1) RIGHT SIDE UP.

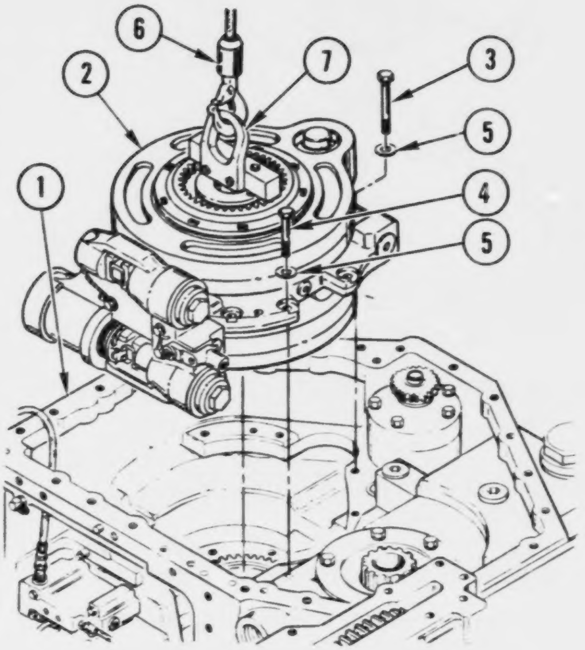
WARNING

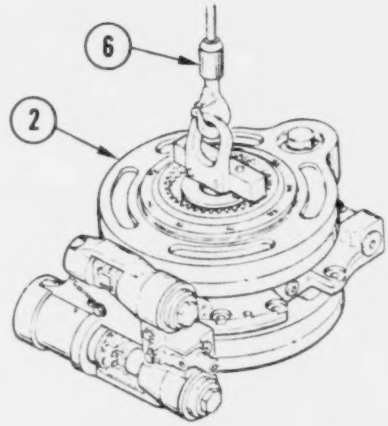
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

CAUTION

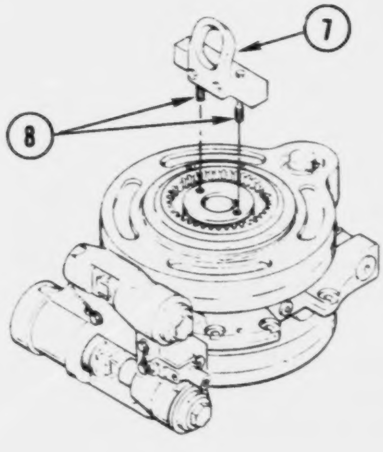
Do not contact hoses with hydraulic assembly when lifting from transmission. Damage to equipment can occur.

19. REPAIRER AND HELPER REMOVE HYDRAULIC ASSEMBLY (2).
    a. Remove one long bolt (3), seven short bolts (4), and eight washers (5).
    b. Attach lifting device (6) to removal assembly (7) and lift out hydraulic assembly (2).





20. PLACE HYDRAULIC ASSEMBLY (2) ON WORK SURFACE.
    a. Lower hydraulic assembly (2) to work surface.
    b. Remove lifting device (6).



21. REMOVE FIXTURE REMOVAL ASSEMBLY (7).
    a. Unscrew two screws (8) and remove removal assembly (7).

21.1 INSPECT HYDRAULIC ASSEMBLY (2). See task INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY, page 4-389.

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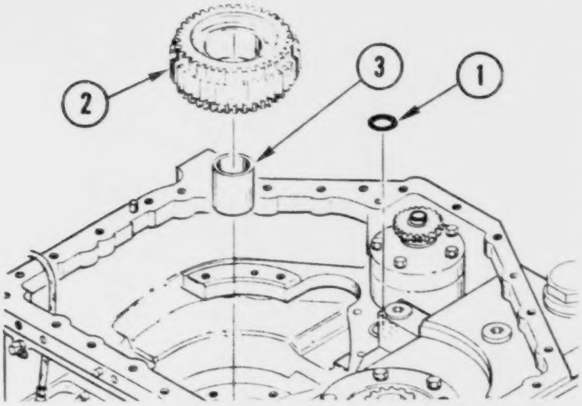
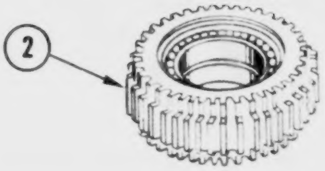


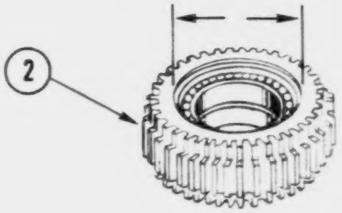
22. REMOVE AND DISCARD PREFORMED PACKING (1).

23. REMOVE SPUR GEAR (2) AND COUPLING (3).

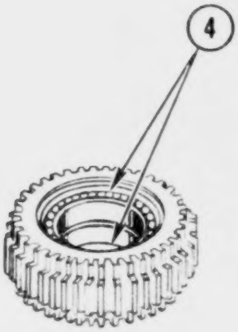
24. INSPECT MAIN HOUSING INSERTS.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



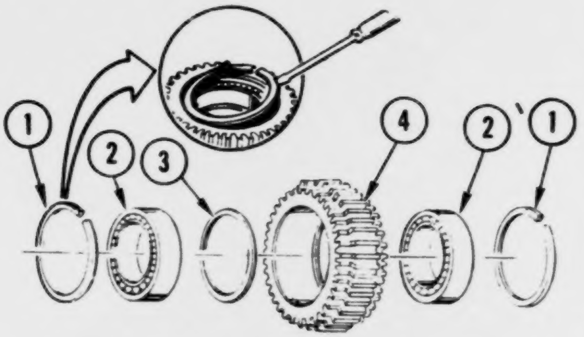
25. INSPECT SPUR GEAR (2).
    a. Inspect gear (2) for damage. See page 2-5. If gear is not damaged, go to step 26. If gear is damaged, go to step 28.



26. CHECK GEAR (2).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of gear (2). If measurement is 4.9204 inches (124.99 mm) or less, go to step 27. If not, go to step 28.

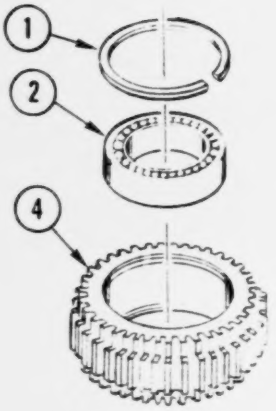


27. INSPECT TWO BEARINGS (4).
    a. Inspect two bearings (4) for damage. See TM 9-214. If either bearing is damaged, go to step 28. If not, go to step 31.

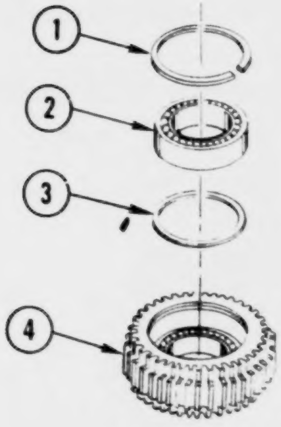


28. REMOVE TWO RETAINING RINGS (1), TWO BEARINGS (2) AND THRUST WASHER (3).
    a. Using screwdriver, remove two retaining rings (1). Save retaining rings for reassembly.
    b. Using arbor press and bearing installer, press out two bearings (2) and washer (3). Save washer for reassembly.
    c. Replace gear (4) if damaged.
    d. Replace bearings (2).

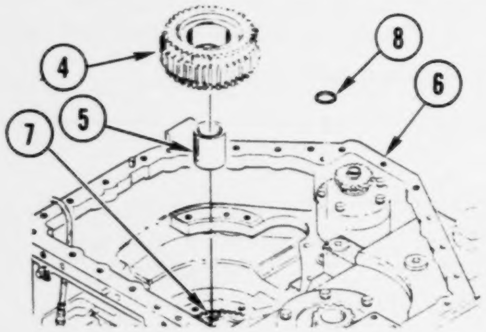
INSTALL



29. INSTALL ONE NEW BEARING (2) AND ONE RETAINING RING (1).
    a. Using arbor press and bearing installer, press bearing (2) into gear (4).
    b. Install retaining ring (1).
    c. Turn gear over.



30. INSTALL WASHER (3), SECOND NEW BEARING (2) AND SECOND RETAINING RING (1).
    a. Place washer (3) in gear (4).
    b. Using arbor press and bearing installer, press second bearing (2) into gear (4).
    c. Install second retaining ring (1).



31. INSTALL SPUR GEAR (4) AND COUPLING (5) IN RIGHT SIDE OF TRANSMISSION HOUSING (6).
    a. Install coupling (5) in left-hand hydraulic assembly (7).
    b. Aline teeth on spur gear (4) with spline on left-hand hydraulic assembly (7). Put in spur gear.

32. INSTALL PREFORMED PACKING (8).
    a. Coat new preformed packing (8) with transmission oil. Install packing.

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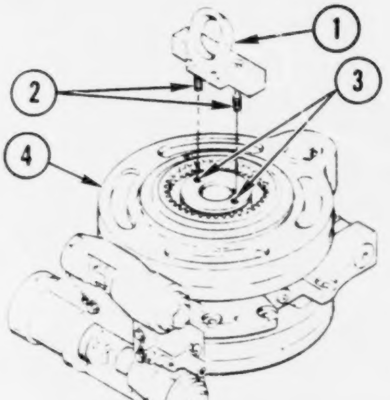
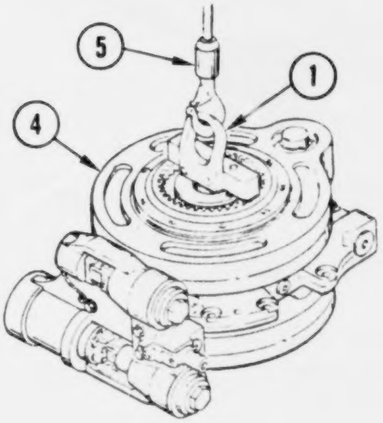


33. ATTACH REMOVAL ASSEMBLY (1).
    a. Install two screws (2) in screw holes (3) in hydraulic assembly (4).
    b. Tighten two screws (2).



WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

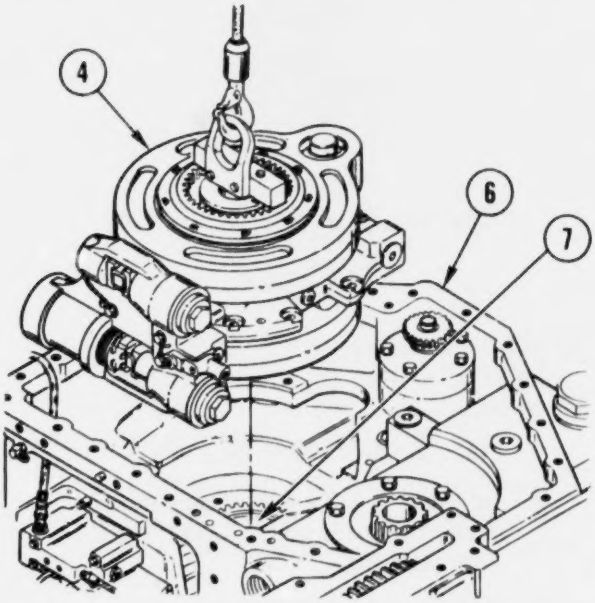
34. LIFT HYDRAULIC ASSEMBLY (4) OFF WORK SURFACE.
    a. Attach lifting device (5) to removal assembly (1).
    b. Lift hydraulic assembly (4) off work surface.

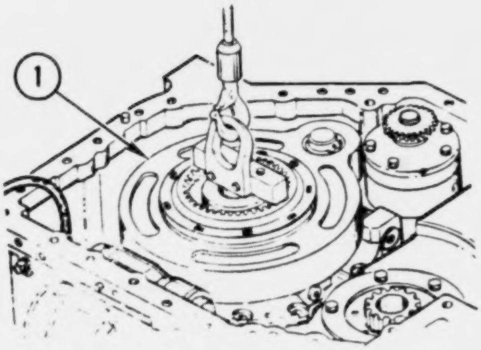
35. IF REMOVED, INSTALL LEFT-HAND HYDRAULIC ASSEMBLY. See task REPLACE LEFT-HAND HYDRAULIC ASSEMBLY, page 4-360.

CAUTION
Do not contact hoses with hydraulic assembly when lowering into transmission. Damage to equipment can occur.

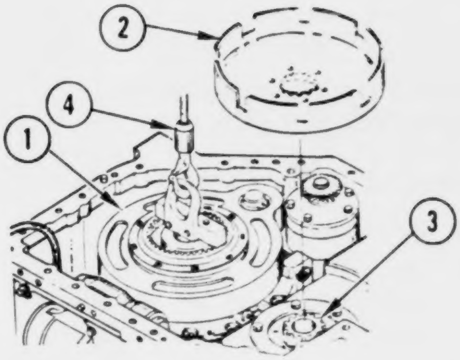
NOTE
Transmission must be level with right side up on tip-over stand.

36. REPAIRER AND HELPER POSITION HYDRAULIC ASSEMBLY (4).
    a. Lower hydraulic assembly (4) into right side of transmission housing (6) until it rests on top of spur gear (7).

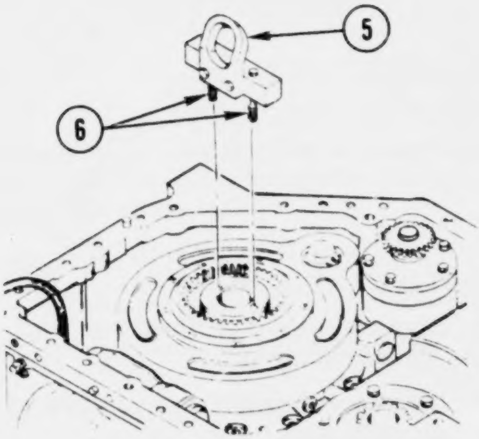




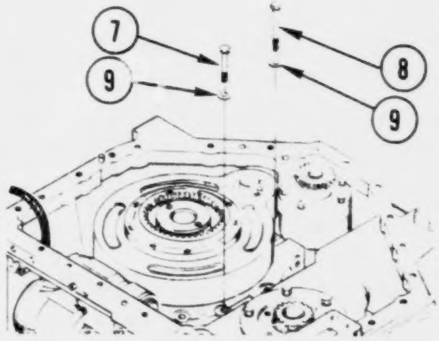
37. ALINE HYDRAULIC ASSEMBLY (1).
   a. Aline hydraulic assembly (1) by moving it back and forth.



38. INSTALL HYDRAULIC ASSEMBLY (1).
   a. Place clutch housing (2) on gearshaft spline (3).
   b. Turn clutch housing (2) back and forth until teeth in spur gear mesh with hydraulic assembly (1). Continue back and forth turning until hydraulic assembly is fully seated.
   c. Remove clutch housing (2).
   d. Remove lifting device (4).



39. REMOVE FIXTURE REMOVAL ASSEMBLY (5).
   a. Loosen two screws (6) until removal assembly (5) can be removed.



40. INSTALL SEVEN SHORT BOLTS (7) AND ONE LONG BOLT (8) WITH EIGHT WASHERS (9).
   a. Coat threads of short seven bolts (7) and one long bolt (8) with sealant compound.
   b. Install eight washers (9), seven short bolts (7), and one long bolt (8).

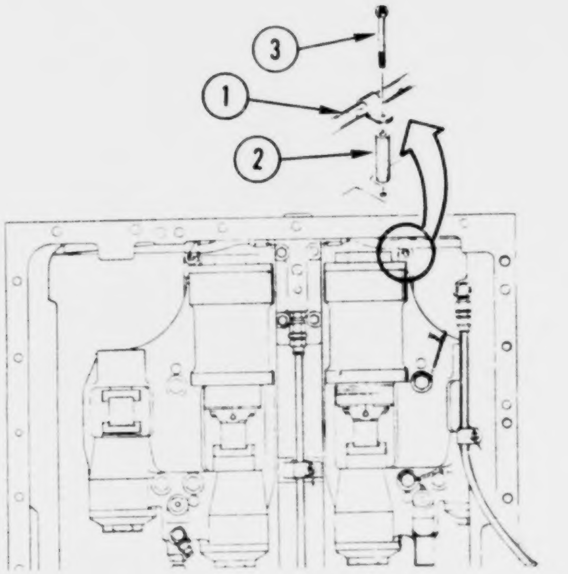
41. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SEVEN BOLTS (7) AND BOLT (8) TO 85-95 ft-lb (12-13 mkg).

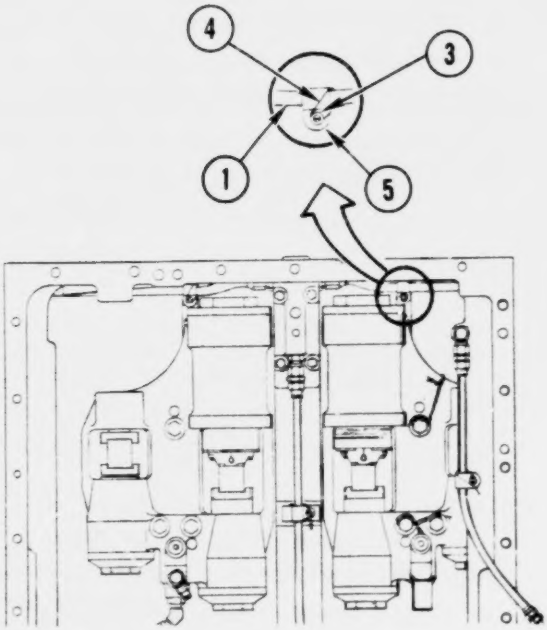
GO TO NEXT PAGE

42. POSITION TRANSMISSION CONTROLLER SIDE UP.

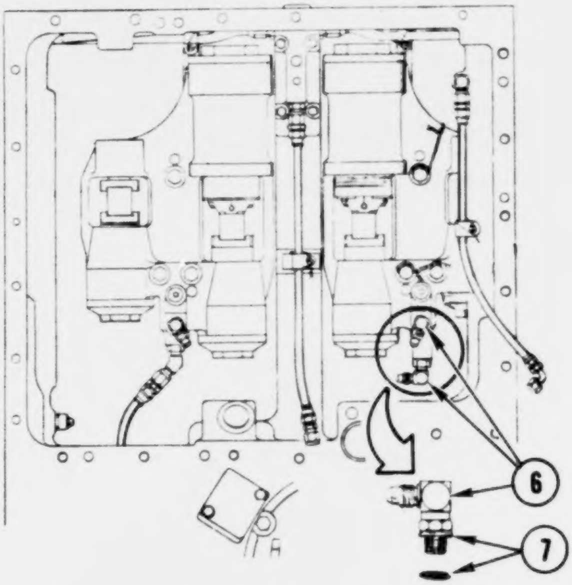
43. SECURE HOSE ASSEMBLY (1).
    a. Install spacer (2).
    b. Using 3/8-inch ratchet handle and 5/32-inch socket wrench attachment, install new screw (3).

44. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (3) TO 35-45 in-lb (40-52 cmkg).

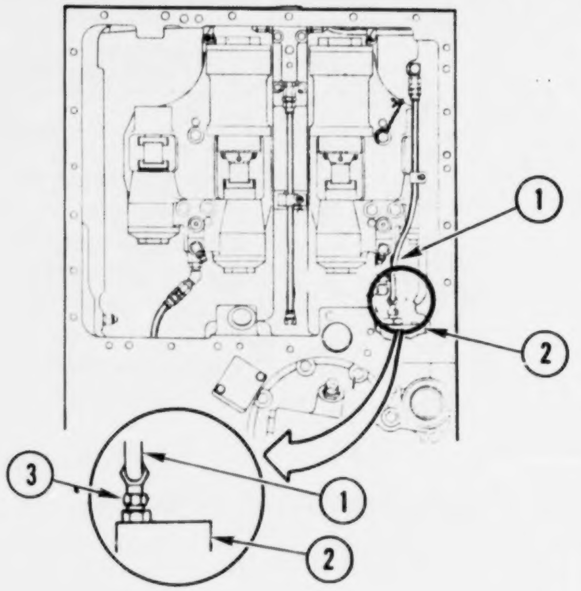




45. INSTALL NEW LOCKWIRE (4).
    a. Using wire-twister pliers, install lockwire (4) through screw (3), around hose assembly (1), and clamp (5).

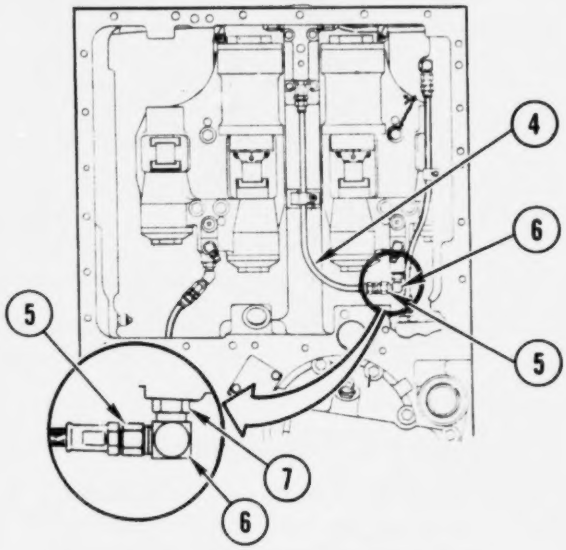


46. INSTALL TWO ELBOWS (6).
    a. Coat two new preformed packings (7) with transmission oil.
    b. Install one new preformed packing (7) on each elbow (6).
    c. Screw in two elbows (6). Hand tighten until captive washers make firm contact with surface. Position elbows (6) so hoses will connect without kinking.



47. CONNECT HOSE ASSEMBLY (1) TO THIRD RANGE RELAY VALVE ASSEMBLY (2).
    a. Screw hose nut (3) onto valve assembly (2).

48. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (3) TO 125-135 in-lb (144-155 cmkg).



49. CONNECT HOSE ASSEMBLY (4).
    a. Screw hose nut (5) onto elbow (6).

50. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (7) TO 125-135 in-lb (144-155 cmkg).

51. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (5) TO 125-135 in-lb (144-155 cmkg).

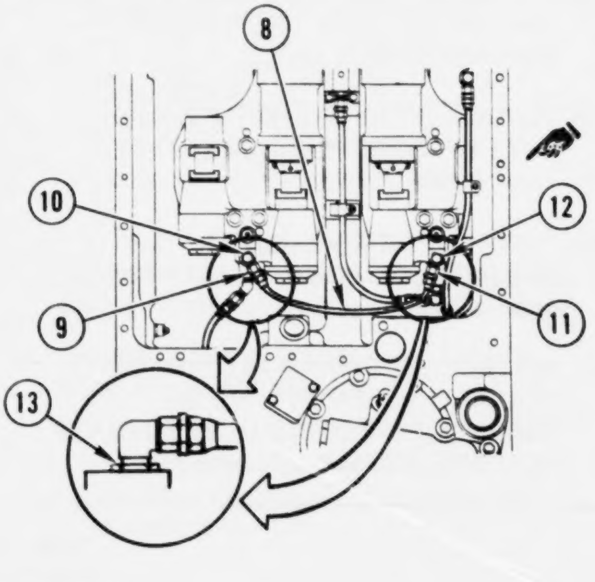
CAUTION

Hose must be installed with a smooth even curve and not touch hardware. Damage to equipment can occur.

52. INSTALL HOSE ASSEMBLY (8).
    a. Screw hose nut (9) onto elbow (10).
    b. Screw hose nut (11) onto elbow (12).

53. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE TWO LOCKNUTS (13) TO 125-135 in-lb (144-155 cmkg).

54. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUTS (9) AND (11) TO 125-135 in-lb (144-155 cmkg).



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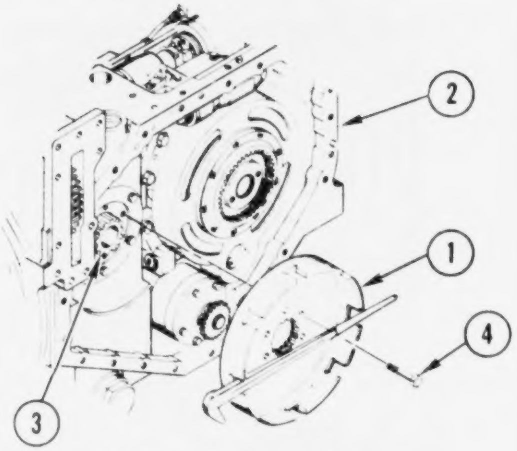
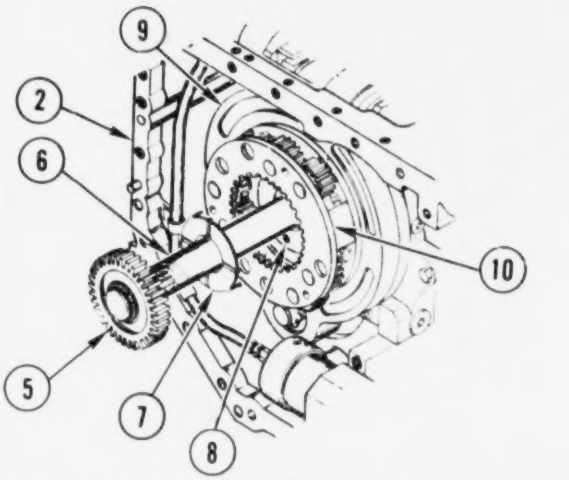


55. INSTALL CLUTCH HOUSING (1).
    a. Working on right side of transmission housing (2), hold clutch housing (1) on gearshaft spline (3) and aline six screw holes.
    b. Install six screws (4).

56. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SIX SCREWS (4).
    a. (H) Use pry bar to hold clutch housing (1) from turning.
    b. Torque six screws (4) to 10-12 ft-lb (1-2 mkg).



57. INSTALL SPUR GEAR (5) WITH SHAFT (6) AND THRUST WASHER BEARING (7).
    a. Working on left side of transmission housing (2), install thrust washer bearing (7). Two tabs on bearing go into two holes (8) in left-hand hydraulic assembly (9).
    b. Install spur gear (5) with splined straight shaft (6). Spur gear goes all the way into differential carrier assembly (10).

58. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

59. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

60. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

61. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

62. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

63. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

64. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

65. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

INSPECT RIGHT-HAND HYDRAULIC ASSEMBLY

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench adapter —
(Item 75, App C)
Socket wrench attachment —
(Item 85, App C)
Socket wrench set — (Item 83, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)

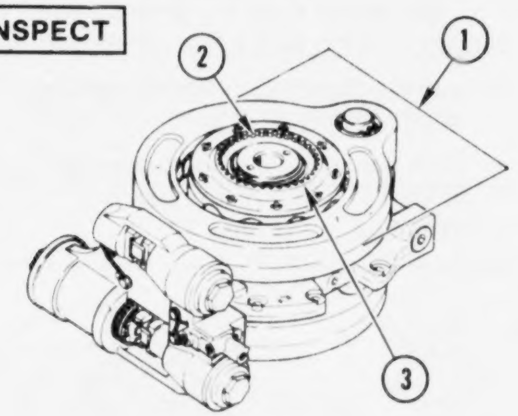
Personnel Required:

Track Veh Rep 63H10
Helper (H)

Equipment Conditions:

Hydraulic assembly on workbench. See page 4-378.

INSPECT

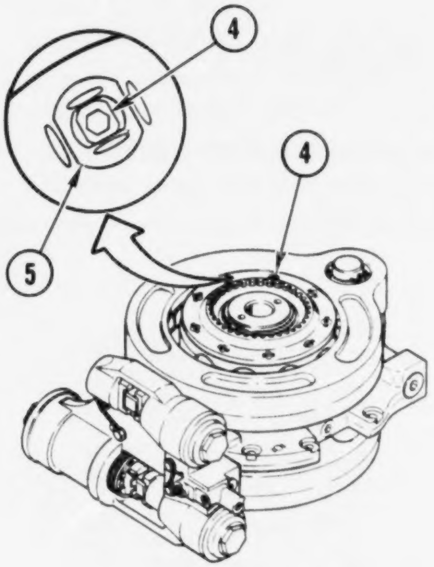


WARNING

Hydraulic assembly is heavy and could fall and injure you or other personnel.

1. REPAIRER AND HELPER POSITION HYDRAULIC ASSEMBLY SO THAT OUTER HYDRAULIC UNIT (1) FACES UP.

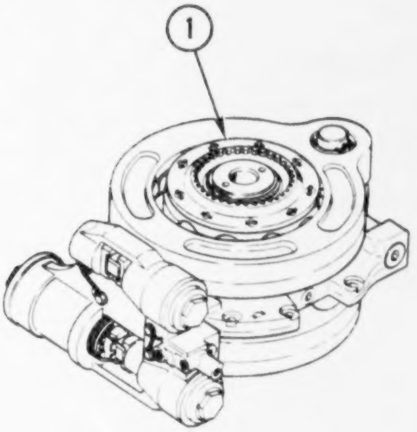
2. INSPECT SPLINED TEETH (2) ON OUTER COUPLING (3).
   a. If teeth (2) are not damaged, go to step 3. If teeth are damaged, go to step 37.



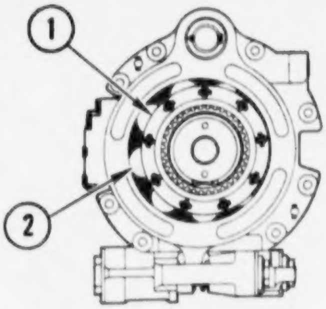
CAUTION
Tools must not be used to inspect tightness of parts. Staking of bushings can be damaged.

3. INSPECT NINE SCREWS (4) AND STAKED BUSHINGS (5).
   a. If screws (4) and bushings (5) are tight, go to step 4. If screws or bushings are loose or missing, go to step 37.

GO TO NEXT PAGE

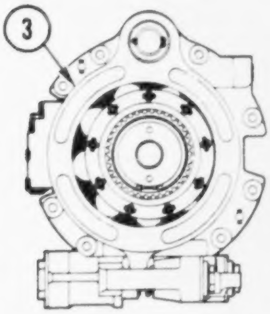


4. INSPECT OUTER TRANSMISSION CYLINDER BLOCK (1).
   a. Rotate cylinder block (1) slowly.
   b. If cylinder block (1) rotates freely, go to step 5. If not, go to step 37.

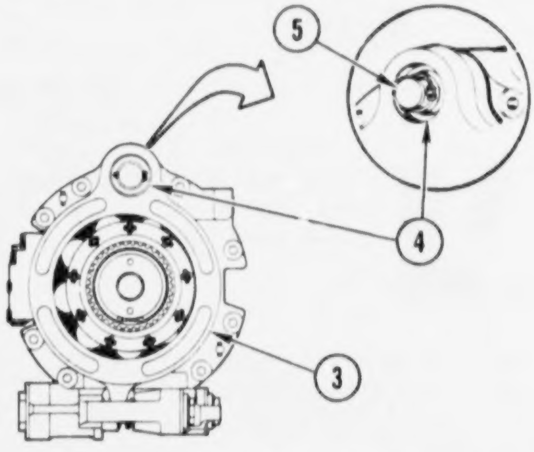


5. CHECK THAT NINE PISTON BALLS (2) MOVE FREELY.
   a. Rotate cylinder block (1) slowly.
   b. If all piston balls (2) move freely in and out of cylinder block (1), go to step 6. If not, go to step 37.

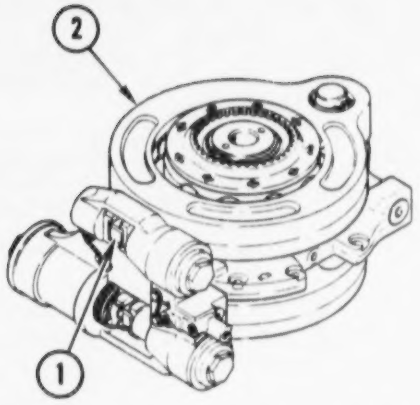
6. INSPECT PISTON BALLS (2).
   a. Inspect piston balls (2) for damage. See page 2-5.
   b. If no piston balls (2) are damaged, go to step 7. If any piston ball is damaged, go to step 37.



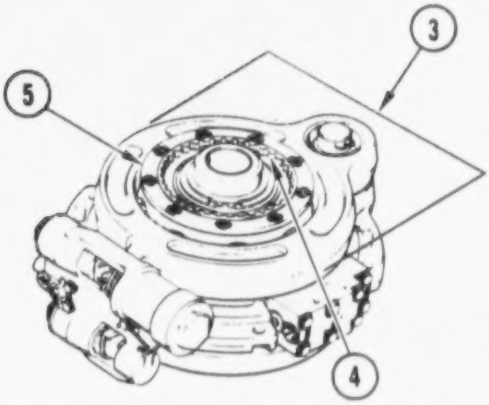
7. INSPECT OUTER HYDRAULIC MOTOR RACE (3).
   a. Inspect outer race (3) for damage. See page 2-5.
   b. If race (3) is not damaged, go to step 8. If race is damaged, go to step 37.



8. CHECK PINTLE PIVOT POINT (4) ON OUTER RACE (3).
   a. Rock race (3) back and forth.
   b. If race (3) rocks freely, go to step 9. If race binds on pintle pin (5), go to step 37.

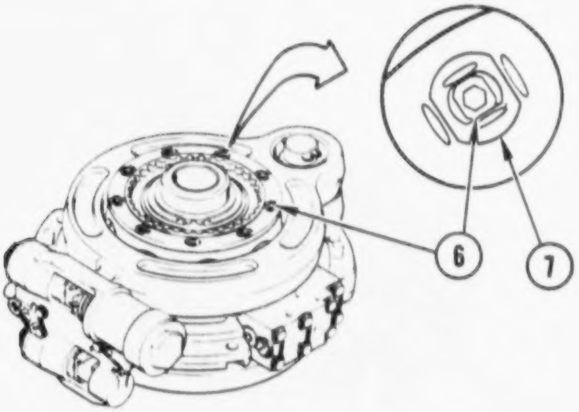


9. INSPECT TANG (1) ON OUTER RACE (2).
   a. Inspect tang (1) for damage. See page 2-5.
   b. If tang (1) is not damaged, go to step 10. If tang is damaged, go to step 37.



10. REPAIRER AND HELPER TURN HYDRAULIC ASSEMBLY SO THAT INNER HYDRAULIC UNIT (3) FACES UP.

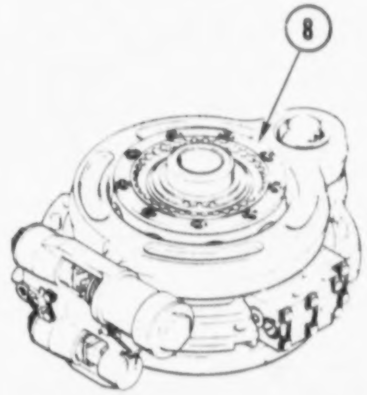
11. INSPECT SPLINED TEETH (4) ON INNER COUPLING (5).
    a. If teeth (4) are not damaged, go to step 12. If teeth are damaged, go to step 37.



CAUTION

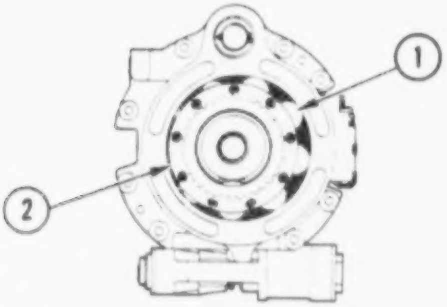
Tools must not be used to inspect tightness of parts. Staking of bushings can be damaged.

12. INSPECT NINE SCREWS (6) AND STAKED BUSHINGS (7).
    a. If screws (6) and bushings (7) are tight, go to step 13. If screws or bushings are loose or missing, go to step 37.



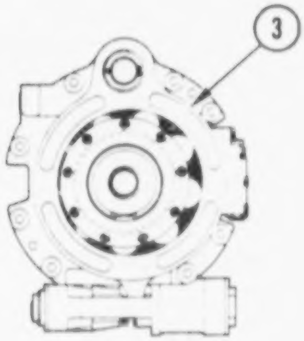
13. INSPECT INNER TRANSMISSION CYLINDER BLOCK (8).
    a. Rotate cylinder block (8) slowly.
    b. If cylinder block (8) rotates freely, go to step 14. If not, go to step 37.

GO TO NEXT PAGE

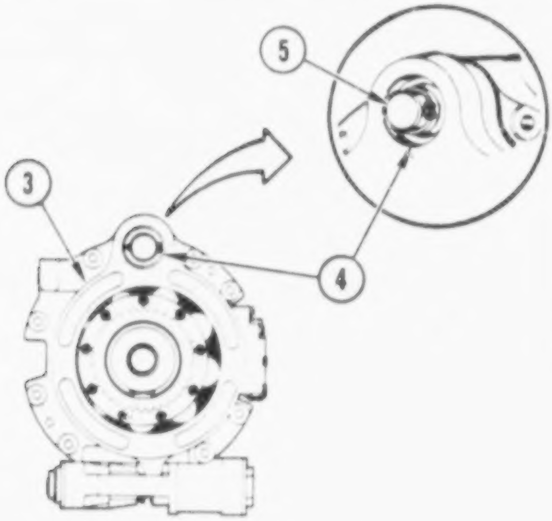


14. CHECK THAT NINE PISTON BALLS (1) MOVE FREELY.
    a. Rotate cylinder block (2) slowly.
    b. If all piston balls (1) move freely in and out of cylinder block (2), go to step 15. If not, go to step 37.

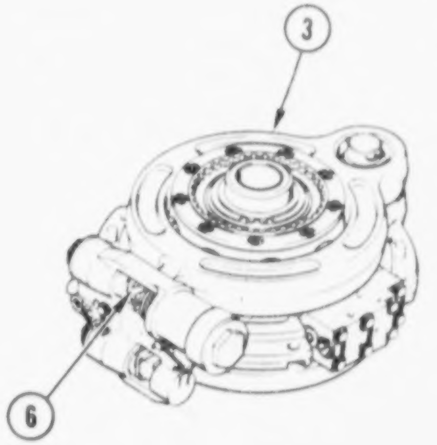
15. INSPECT PISTON BALLS (1).
    a. Inspect piston balls (1) for damage. See page 2-5.
    b. If no piston balls (1) are damaged, go to step 16. If any piston ball is damaged, go to step 37.



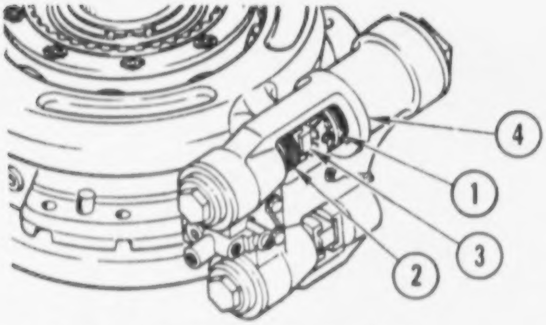
16. INSPECT INNER HYDRAULIC MOTOR RACE (3).
    a. Inspect inner race (3) for damage. See page 2-5.
    b. If race (3) is not damaged, go to step 17. If race is damaged, go to step 37.



17. CHECK PINTLE PIVOT POINT (4) ON INNER RACE (3).
    a. Rock race (3) back and forth.
    b. If race (3) rocks freely, go to step 18. If race binds on pintle pin (5), go to step 37.



18. INSPECT TANG (6) ON INNER RACE (3).
    a. Inspect tang (6) for damage. See page 2-5.
    b. If tang (6) is not damaged, go to step 19. If tang is damaged, go to step 37.

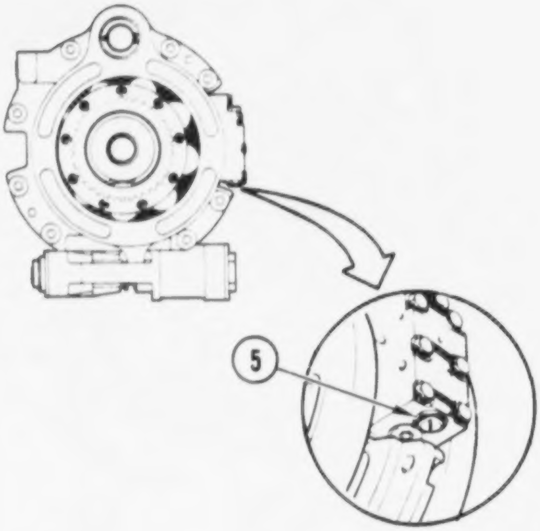


19. CHECK ACTUATOR PISTON ASSEMBLY (1) AND ACTUATOR PISTON (2).

    a. Move tang (3) back and forth by pressing piston(1) into housing (4) with finger and releasing.

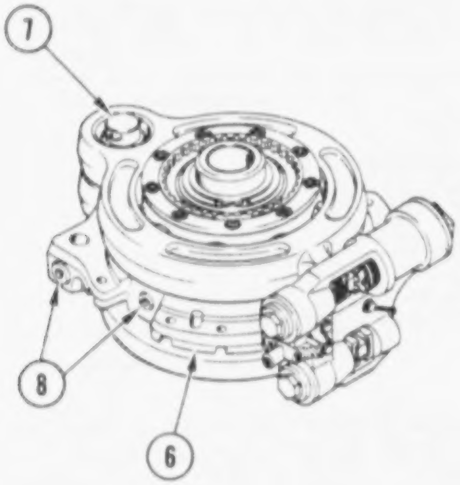
    b. If tang (3) moves freely and pistons (1) and (2) move smoothly back and forth, go to step 20.

    c. If tang (3) does not return smoothly to center position with pistons (1) and (2) resting against tang, go to step 37.



20. INSPECT PLAIN NUT (5).

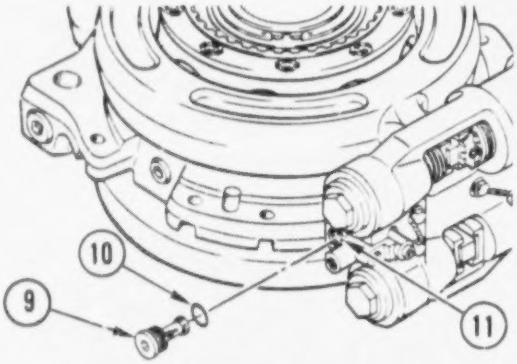
    a. If nut (5) is tight, go to step 21. If nut is loose or missing, go to step 37.



21. INSPECT PINTLE ASSEMBLY (6).

    a. If pintle assembly (6) and pin (7) are not damaged and plugs (8) are installed, go to step 22.

    b. If pintle assembly (6) or pin (7) is damaged or plugs (8) are missing, go to step 37.



22. REMOVE PRESSURE FLUID FILTER (9).

    a. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, remove filter (9).

    b. Remove preformed packing (10).

23. INSPECT FILTER (9) AND FILTER CAVITY (11).

    a. If metal chips are found, go to step 24. If not, discard packing (10) and go to step 26.

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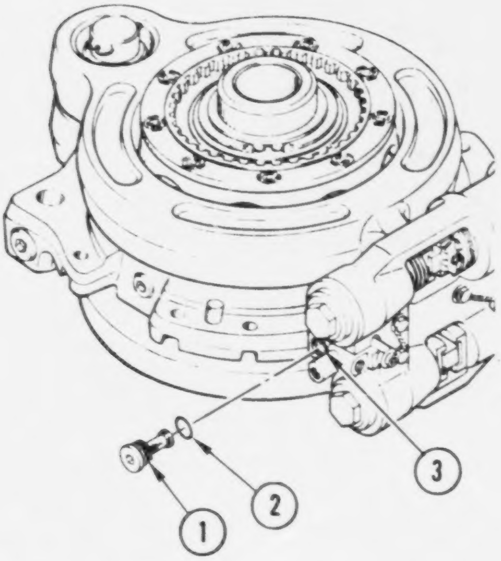
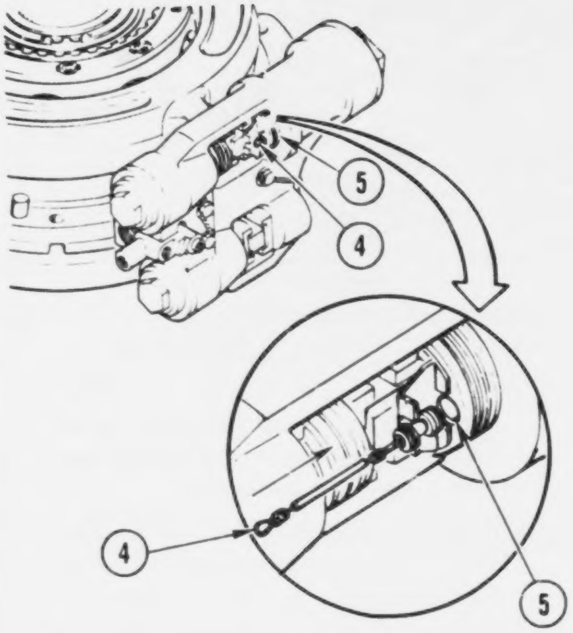
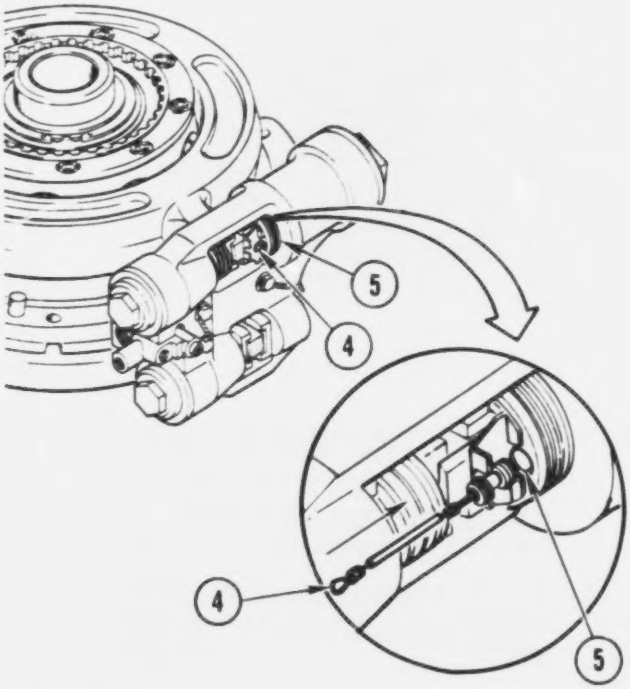


24. INSTALL FILTER (1).
    a. Install packing (2) on filter (1).
    b. Install filter (1) in filter cavity (3).
    c. Tighten filter (1).

25. GO TO STEP 37.



26. CHECK ACTUATOR VALVE ASSEMBLY (4).
    a. Move valve assembly (4) in and out of piston (5).
    b. If valve assembly (4) binds, go to step 27. If not, go to step 30.

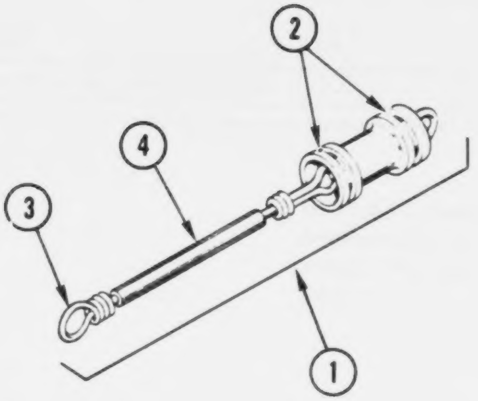


27. REMOVE VALVE ASSEMBLY (4).
    a. Carefully pull valve assembly (4) straight out of hole in piston (5).

28. REPLACE VALVE ASSEMBLY (4).

29. GO TO STEP 32.

30. REMOVE VALVE ASSEMBLY (4).
    a. Carefully pull valve assembly (4) straight out of hole in piston (5).

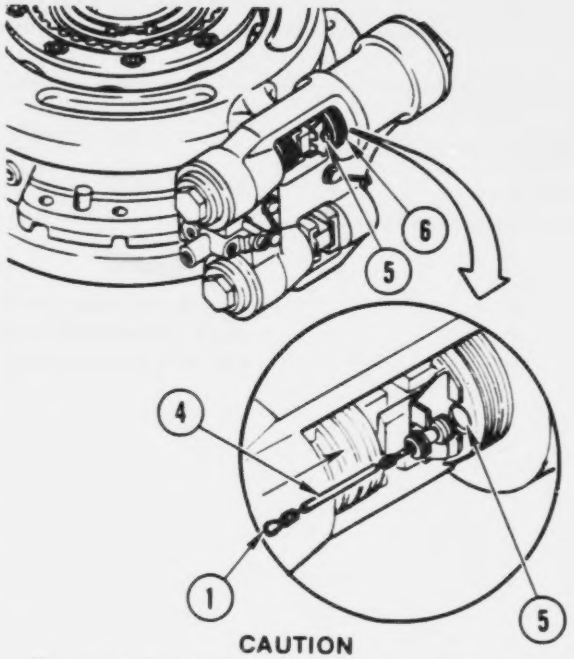


31. INSPECT VALVE ASSEMBLY (1).

    a. Replace valve assembly (1) if valve lands (2), eye (3), or tube (4) are damaged.

32. CLEAN RIGHT-HAND HYDRAULIC ASSEMBLY.

    a. Clean assembly and piece parts. See page 2-2.



CAUTION

Do not bend tube when installing valve assembly. Valve assembly can be damaged.

33. INSTALL VALVE ASSEMBLY (1).

    a. Coat valve assembly (1) with transmission oil.

    b. Carefully slide valve assembly (1) into hole (5) in piston (6). Do not bend tube (4).

---

34. INSTALL FILTER (7).

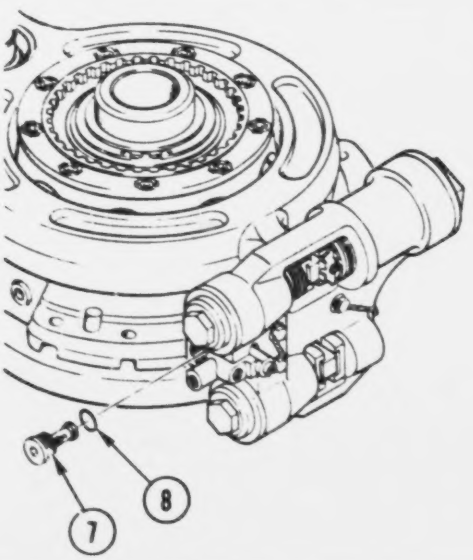
    a. Install new packing (8) on filter (7).

    b. Using 3/8-inch drive ratchet handle and 5/16-inch socket wrench attachment, install filter (7).

35. USING 1/2-INCH DRIVE TORQUE WRENCH, 1/2-INCH TO 3/8-INCH ADAPTER, AND 5/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE FILTER (7) TO 40-45 ft-lb (6 mkg).

36. GO TO END OF TASK.

37. REPLACE RIGHT-HAND HYDRAULIC ASSEMBLY.



END OF TASK

Section XIV. SPUR GEARSHAFT

TASK INDEX

Task	Page	Task	Page
Replace Spur Gearshaft	4-398	Repair Spur Gearshaft	4-400

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE SPUR GEARSHAFT

DESCRIPTION

This task covers: Remove (page 4-398). Install (page 4-399).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

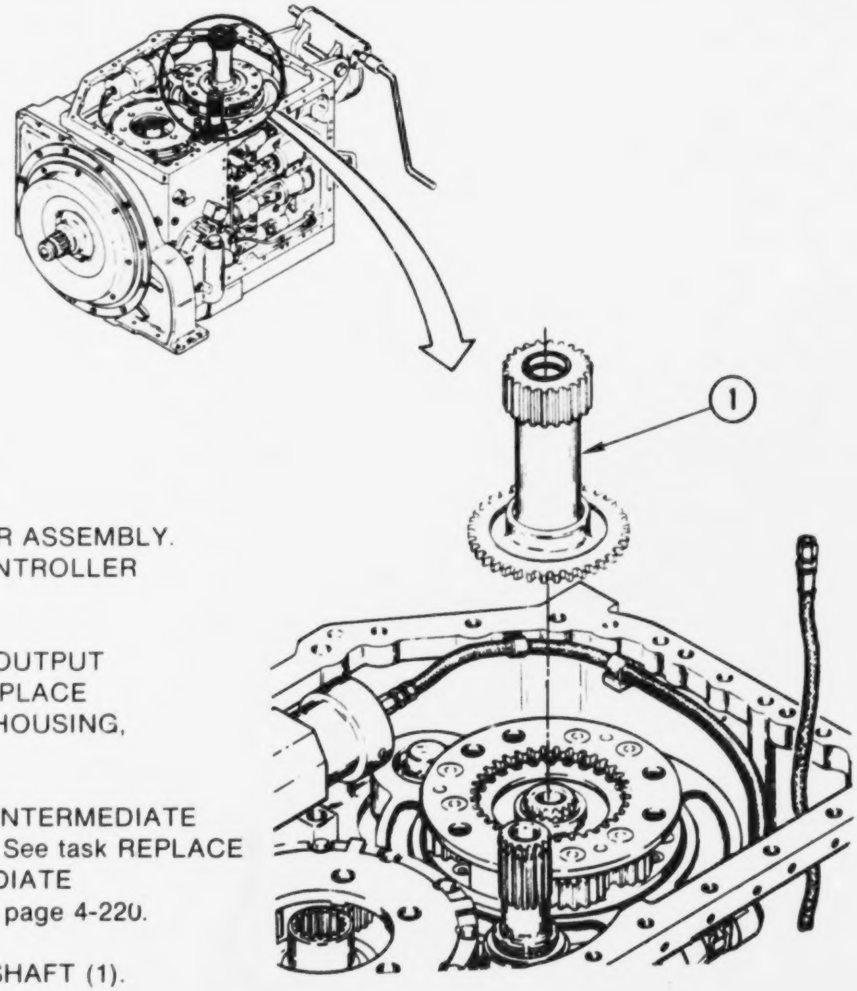
Personnel Required:

Track Veh Rep 63H10

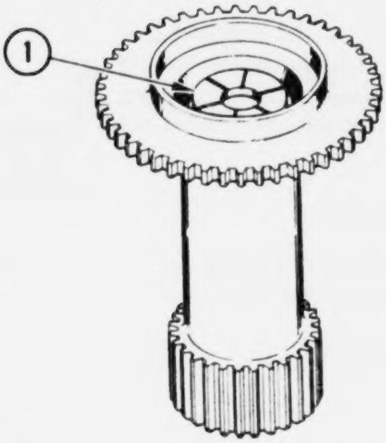
Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

REMOVE



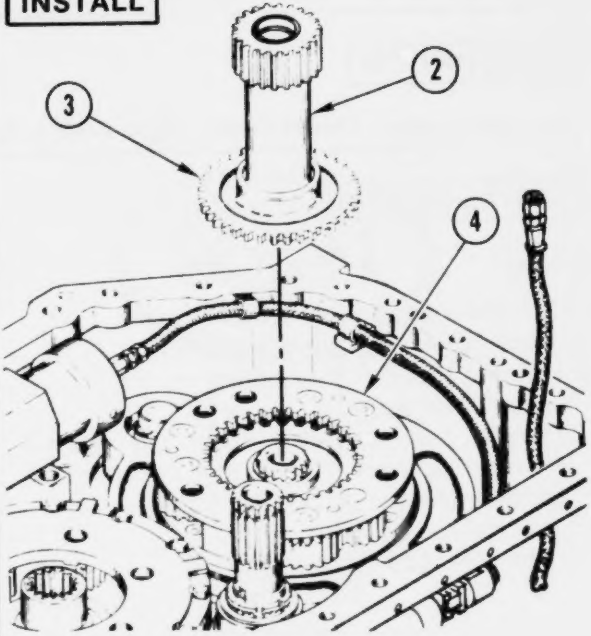
1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. REMOVE SPUR GEARSHAFT (1).



5. INSPECT THRUST WASHER BEARING (1) FOR DAMAGE. See page 2-5
   a. If bearing (1) is damaged, go to step 6. If not, go to step 7.

6. REPAIR SPUR GEARSHAFT, page 4-400.

INSTALL



7. INSTALL GEARSHAFT (2).
   a. Aline gear teeth (3) of gearshaft (2) with teeth on cylinder block (4).
   b. Install gearshaft (2).

---

8. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

9. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314

10. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR SPUR GEARSHAFT

DESCRIPTION

This task covers: Disassemble (page 4-400). Assembly (page 4-401).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Leather gloves — (Item 42, App C)
Thermal drying oven — (Item 94, App C)

Materials/Parts:

Dry ice—(Item 4, App B)
Thrust washer bearing

Personnel Required:

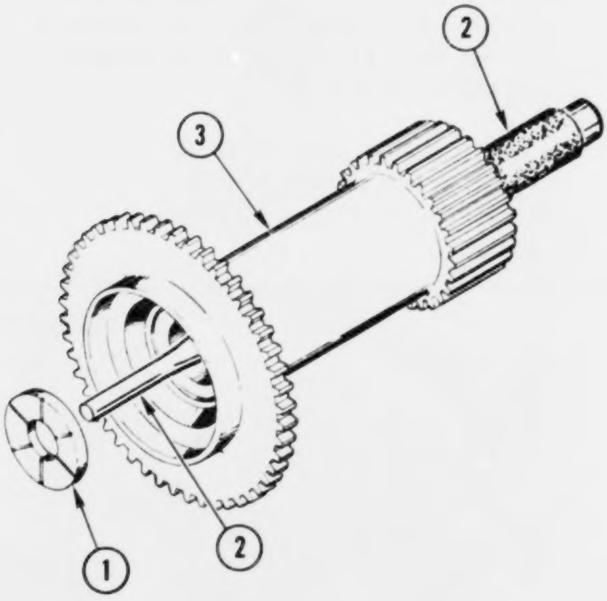
Track Veh Rep 63H10

Equipment Conditions:

Spur gearshaft on workbench. See page 4-398.

DISASSEMBLE

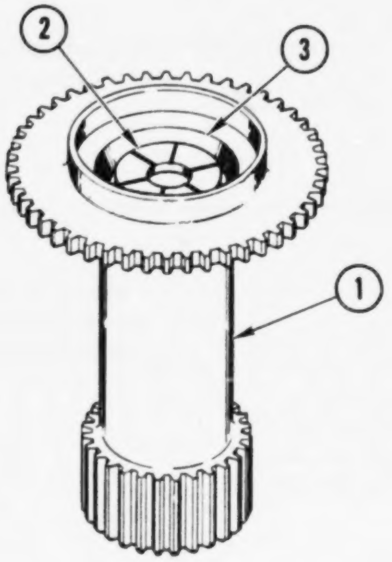
1. REMOVE THRUST WASHER BEARING (1).
   a. Insert drive punch (2) in hole at small end of spur gearshaft (3).
   b. Tap punch (2) with hammer to remove bearing (1). Discard bearing.
2. CLEAN SPUR GEARSHAFT (3). See page 2-2.
3. INSPECT SPUR GEARSHAFT (3). See page 2-5.



ASSEMBLE

WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.



4. PREPARE GEARSHAFT (1) AND NEW BEARING (2) FOR ASSEMBLY.
   a. Place gearshaft (1) in oven at 270° -300° F (132° -149° C) for 30 minutes.
   b. Cool new bearing (2) in dry ice to -40° F (-40° C).
   c. Wearing gloves, remove spur gearshaft (1) from oven.
5. INSTALL NEW BEARING (2).
   a. Position new bearing (2) in hole (3).
   b. Using plastic-faced hammer, tap new bearing (2) into place.

END OF TASK

Section XV. COOLANT AND TIME DELAY VALVE ASSEMBLY

TASK INDEX

Task Page

Replace Coolant and Time Delay Valve Assembly 4-404

Repair Coolant and Time Delay Valve Assembly 4-408

Repair Coolant and Time Delay Valve Housing Inserts 4-415

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE COOLANT AND TIME DELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-404). Install (page 4-406).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inserted hammer face holder — (Item 39A, App C)
- Inserted hammer face — (Item 39B, App C)
- Inserted hammer face — (Item 39C, App C)
- Socket wrench adapter — (Item 74, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Sealant Compound — (Item 6, App B)

Materials/Parts: (cont)

- Wiping rag—(Item 13, App B)
- Gasket
- Gasket
- Gasket
- Lock washer (17)

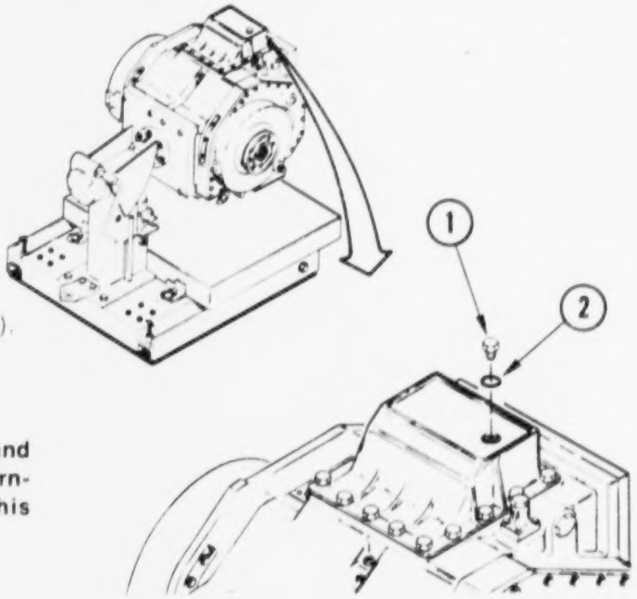
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Transmission mounted on tip-over stand. See page 2-144.

REMOVE

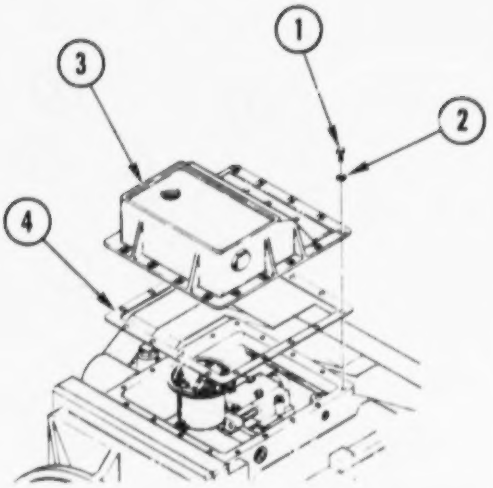


1. REMOVE PLUG (1) AND GASKET (2). DISCARD GASKET.

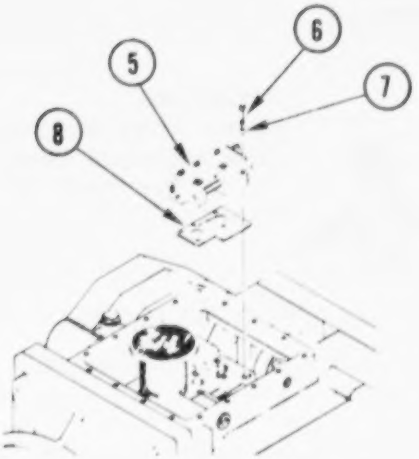
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

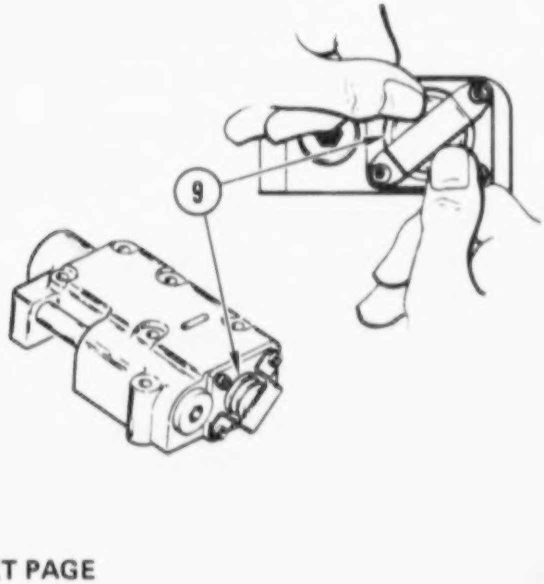
2. CLEAN PLUG (1).
   a. Use wiping rag dampened with cleaning solvent.



3. REMOVE 17 BOLTS (1).
   a. Remove 17 bolts (1) and lock washers (2). Discard lock washers.
4. REMOVE SUMP COVER (3).
   a. Remove cover (3) and gasket (4). Discard gasket.



5. REMOVE COOLANT AND TIME DELAY VALVE ASSEMBLY (5).
   a. Remove six screws (6) and washers (7).
   b. Using plastic-faced hammer, tap and remove valve assembly (5).
   c. Remove and discard gasket (8).
6. INSPECT INSERTS IN BOTTOM OF MAIN HOUSING.
   a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



7. INSPECT DIRECTIONAL CONTROL SLIDE (9) FOR FREE MOVEMENT.
   a. Push in slide (9) and release. Slide must snap back.
   b. If slide (9) is stuck in housing, go to step 8. If not, go to step 9.
8. REPAIR COOLANT AND TIME DELAY VALVE ASSEMBLY, page 4-408.

GO TO NEXT PAGE

INSTALL

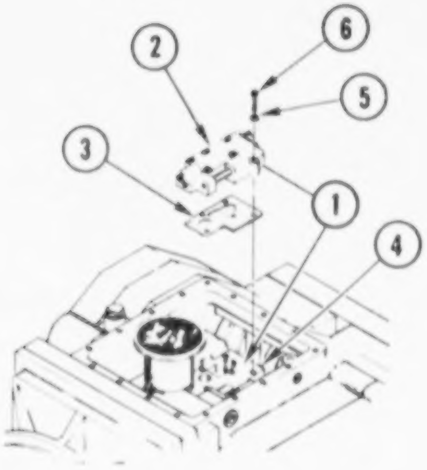
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

9. CLEAN MATING SURFACES (1).
   a. Use wiping rag dampened with cleaning solvent.

10. INSTALL VALVE ASSEMBLY (2).
    a. Install new gasket (3) on housing (4).
    b. Install valve assembly (2).
    c. Install six washers (5) and screws (6).

11. USING 3/8-INCH DRIVE TORQUE WRENCH WITH ADAPTER, TORQUE SIX SCREWS (6) TO 80-100 in-lb (92-115 cmkg).



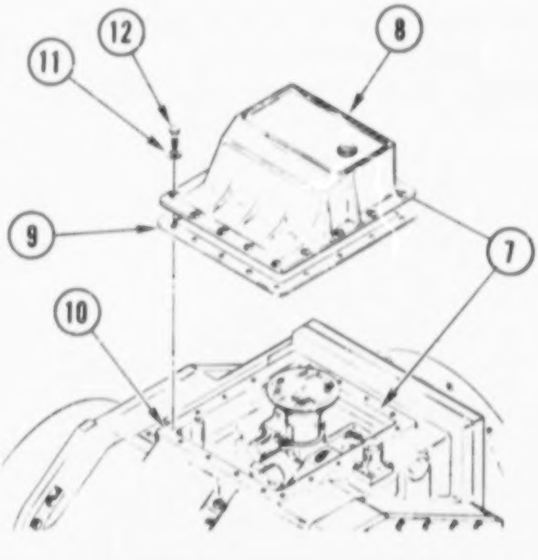
WARNING

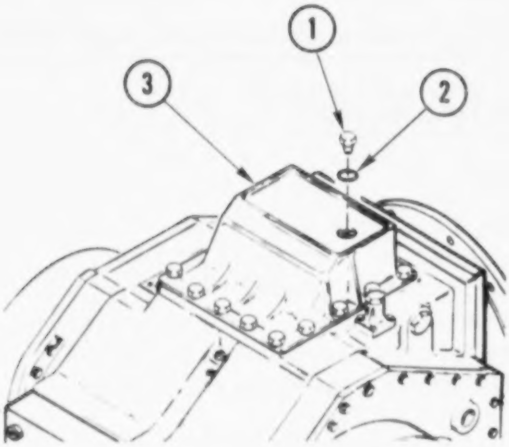
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

12. CLEAN MATING SURFACES (7).
    a. Use wiping rag dampened with cleaning solvent.

13. INSTALL SUMP COVER (8).
    a. Position new gasket (9) and sump cover (8) on housing (4).
    b. Install 17 new lock washers (9) and bolts (10).

14. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 17 BOLTS (10) TO 15-20 ft-lb (2-3 mkg).





15. INSTALL PLUG (1).
    a. Install new gasket (2) on plug (1).
    b. Apply sealant compound to threads of plug (1).
    c. Install plug (1) in sump cover (3).
16. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE PLUG (1) TO 55-60 ft-lb (8 mkg).

END OF TASK

REPAIR COOLANT AND TIME DELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-408). Assemble (page 4-411).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inside/outside indicator caliper — (Item 41, App C)
Machinist's vise — (Item 47, App C)
Micrometer caliper set — (Item 52, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench attachment — (Item 83, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Tools: (cont)

Timing device-capable of measuring 15 seconds

Materials/Parts:

Transmission oil—(Item 12, App B)
Preformed packing
Preformed packing
Retaining ring

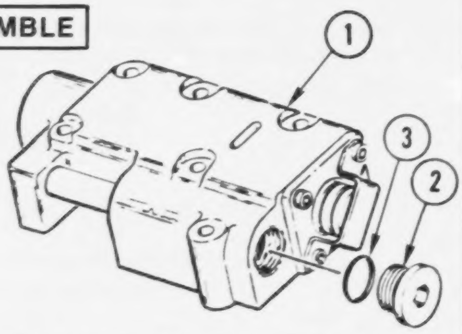
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

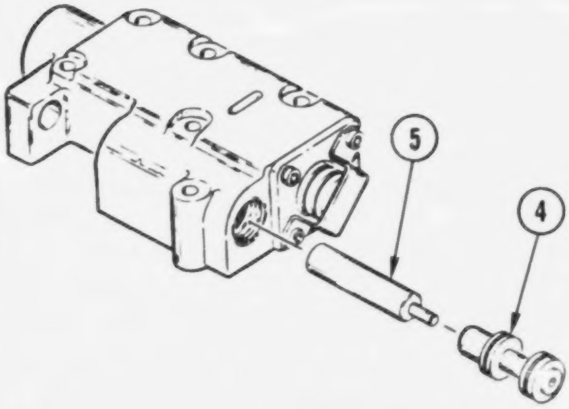
Coolant and time delay valve assembly on workbench. See page 4-404.

DISASSEMBLE



1. PLACE COOLANT AND TIME DELAY VALVE ASSEMBLY (1) IN VISE.

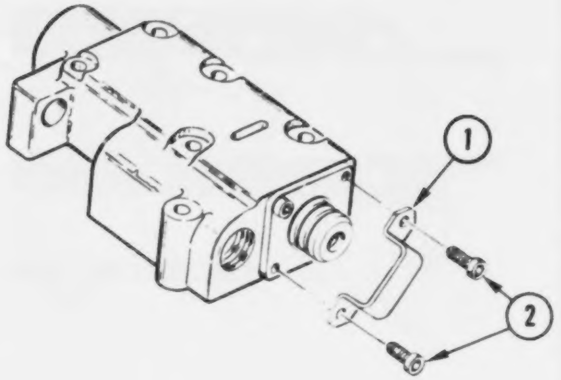
2. REMOVE PLUG (2).
   a. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, remove plug (2).
   b. Remove and discard preformed packing (3).



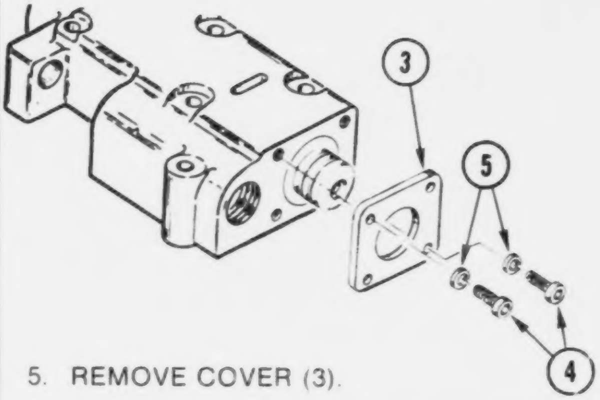
CAUTION

Directional control slide and slide bore in valve are precision fit parts. Do not drop, scratch, or nick spool. Equipment can be damaged.

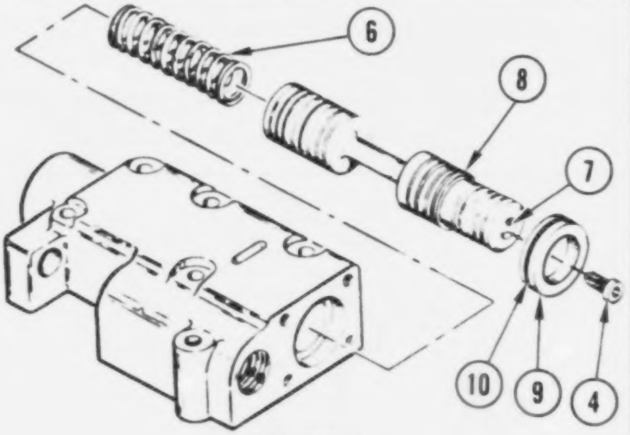
3. REMOVE DIRECTIONAL CONTROL SLIDE (4) AND DASHPOT (5).



4. REMOVE RETAINING STRAP (1).
   a. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove two screws (2).
   b. Remove strap (1).



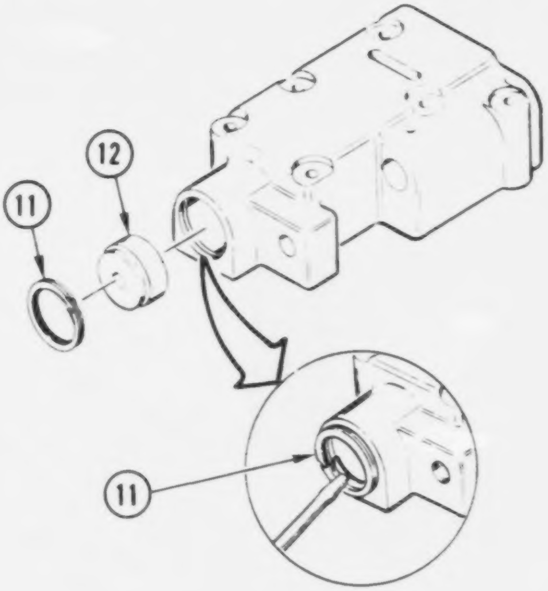
5. REMOVE COVER (3).
   a. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, evenly loosen two screws (4).
   b. Remove two screws (4) and washers (5).
   c. Remove cover (3).



CAUTION

Directional control slide and slide bore in valve are precision fit parts. Do not drop, scratch, or nick slide. Equipment can be damaged.

6. REMOVE SPRING (6).
   a. Insert one screw (4) from step 5 in threaded hole (7).
   b. Pull out directional control slide (8), retaining ring (9), preformed packing (10), and spring (6). Discard packing.
   c. Remove screw (4) from slide (8).



7. USING FLAT-TIP SCREWDRIVER, REMOVE AND DISCARD RETAINING RING (11).

8. REMOVE PLUG (12).

GO TO NEXT PAGE

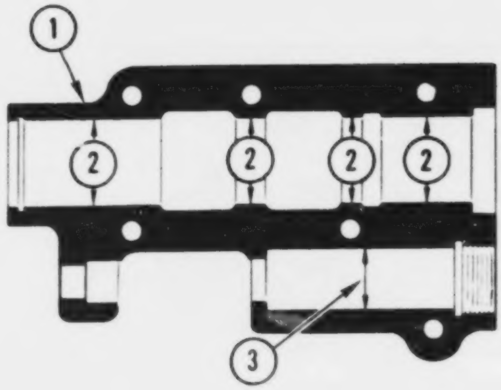
9. CLEAN COOLANT AND TIME DELAY VALVE ASSEMBLY.

   a. Clean assembly and hardware. See page 2-2.

10. INSPECT COOLANT AND TIME DELAY VALVE ASSEMBLY.

    a. Inspect assembly, piece parts, and inserts. See page 2-5.

    b. Repair inserts if damaged. See task REPAIR COOLANT AND TIME DELAY VALVE HOUSING INSERTS, page 4-415.



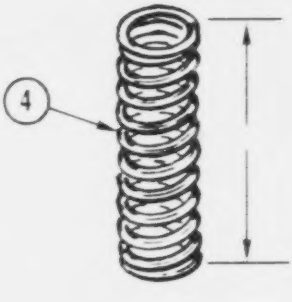
11. CHECK HOUSING (1).

    a. Using micrometer caliper set and telescoping gage set, measure four diameters (2).

    b. Replace housing (1) if any measurement is greater than 1.165 inches (29.59 mm).

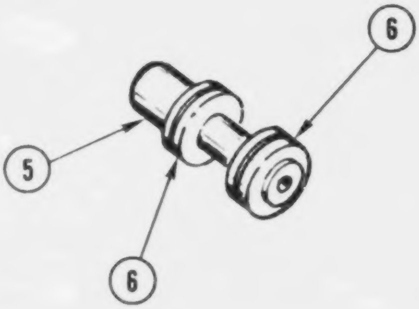
    c. Using micrometer caliper set and telescoping gage set, measure diameter (3).

    d. Replace housing (1) if measurement is greater than 0.814 inch (20.68 mm).



12. CHECK SPRING (4).

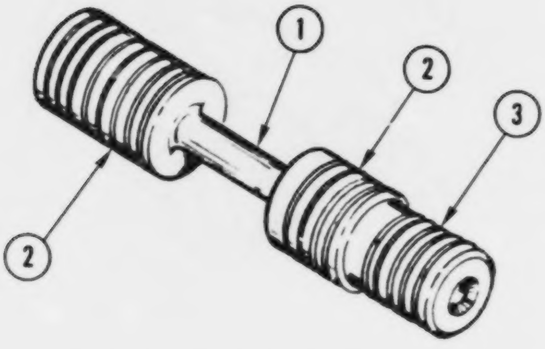
    a. Using indicator caliper, measure free length of spring (4). Replace spring if free length is less than 3.32 inches (84.3 mm).



13. CHECK DIRECTIONAL CONTROL SLIDE (5).

    a. Using micrometer caliper set, measure two diameters (6).

    b. Replace slide (5) if either measurement is less than 0.8112 inch (20.604 mm).



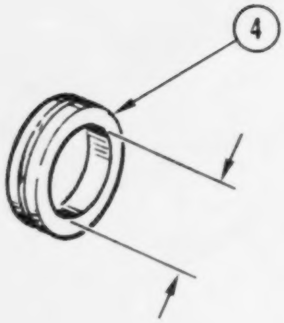
14. CHECK DIRECTIONAL CONTROL SLIDE (1).

   a. Using micrometer caliper set, measure two diameters (2).

   b. Replace slide (1) if measurements are less than 1.1237 inches (28.542 mm).

   c. Measure diameter (3).

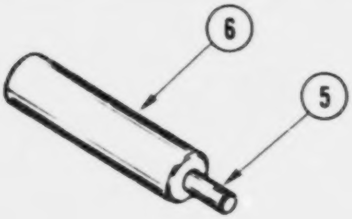
   d. Replace slide (1) if measurement is less than 0.9987 inch (25.367 mm).



15. CHECK RING (4).

   a. Using telescoping gage set and micrometer caliper set, measure bore of ring (4).

   b. Replace ring (4) if bore measurement is greater than 1.0015 inches (25.438 mm).



NOTE
Piston will move very slowly both in and out.

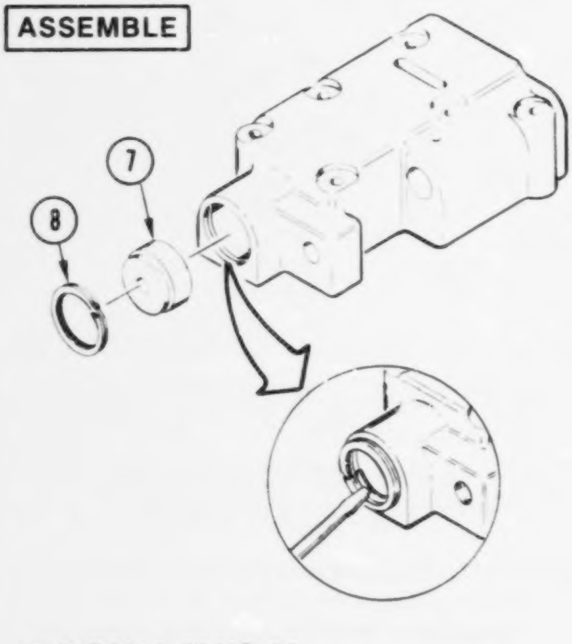
16. CHECK RETURN TIME OF PISTON (5) IN DASHPOT (6).

   a. Push in piston (5) and maintain pressure until it stops. Release piston.

   b. Using timing device, check return time of piston (5) in dashpot (6).

   c. Replace dashpot (6) if piston (5) does not return to a length of 0.40-0.50 inch (10.2-12.7 mm) in 10-20 seconds.

ASSEMBLE



17. INSTALL PLUG (7).

18. USING FLAT-TIP SCREWDRIVER, INSTALL NEW RETAINING RING (8).

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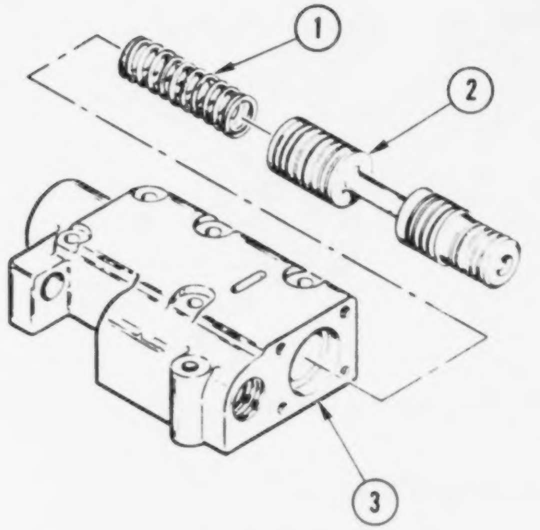
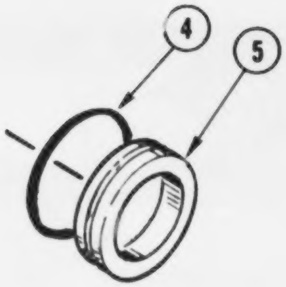


19. INSTALL SPRING (1) IN SLIDE (2).

20. INSTALL SPRING (1) AND SLIDE (2) IN HOUSING (3).



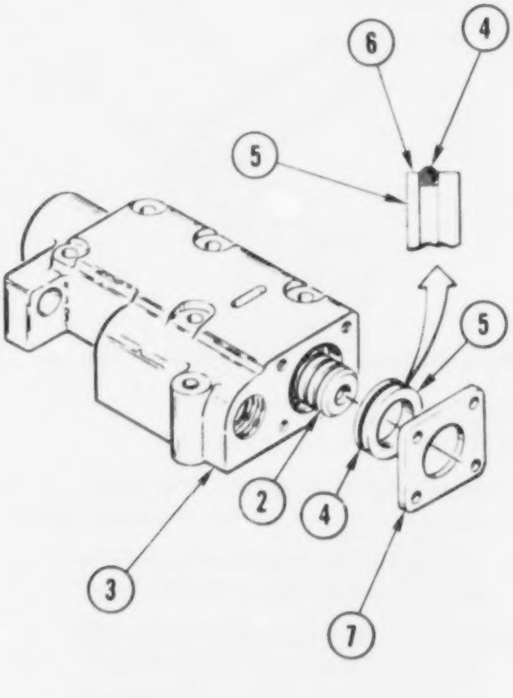
CAUTION

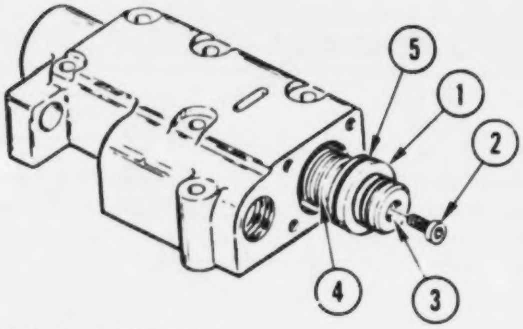
Do not damage preformed packing during installation. Failure of equipment can result.

21. INSTALL NEW PREFORMED PACKING (4) ON RING (5).
    a. Coat new preformed packing (4) with transmission oil.
    b. Install preformed packing (4) in groove on ring (5).

22. INSTALL RING (5).
    a. Position ring (5) with thin rim (6) facing slide (2).
    b. Install ring (5). Using cover (7), press ring evenly into place.

23. REMOVE COVER (7) AND INSPECT PREFORMED PACKING (4) FOR DAMAGE. DO NOT REMOVE RING (5) FROM HOUSING (3).
    a. If preformed packing (4) is damaged, go to step 24. If not, go to step 27.

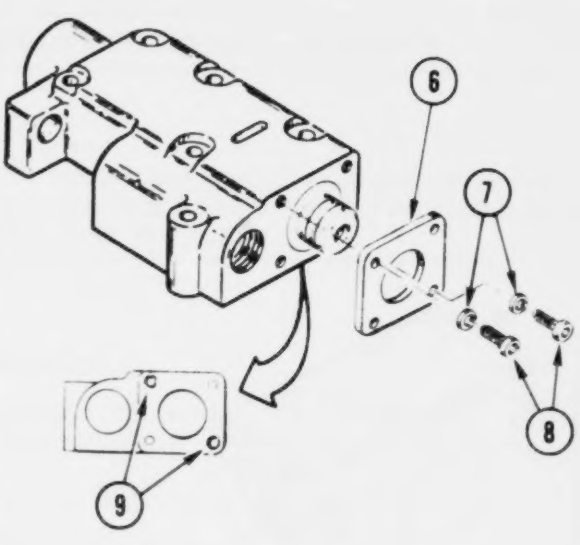




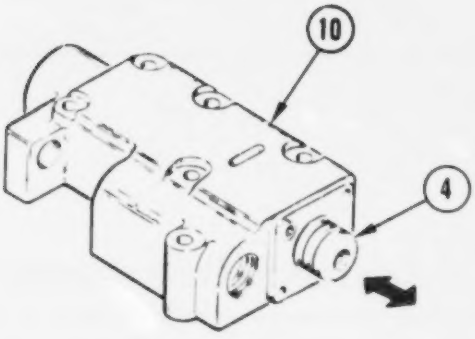
24. REMOVE RING (1).
    a. Install screw (2) from step 5 in threaded hole (3) in directional control slide (4).
    b. Pull out slide (4) and ring (1) far enough to remove ring. Remove and discard preformed packing (5).
    c. Remove screw (2) from slide (4).

25. PUSH SLIDE (4) BACK IN PLACE.

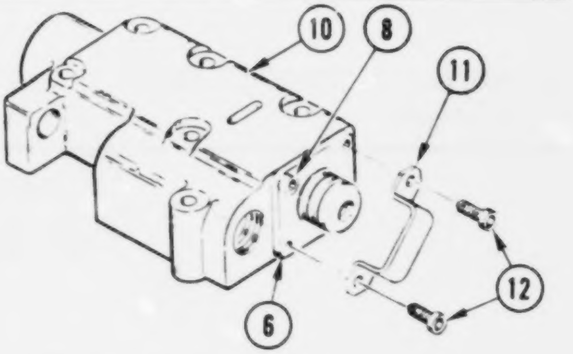
26. GO TO STEP 21.



27. INSTALL COVER (6).
    a. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install two washers (7) and screws (8) in threaded holes (9).



28. CHECK THAT SLIDE (4) MOVES FREELY IN HOUSING (10).
    a. Push in slide (4) and release. Slide should snap back.
    b. Repeat step 28a several times.
    c. If slide (4) moves freely in housing (10), go to step 29. If not, go to step 5.



29. INSTALL STRAP (11).
    a. Insert two screws (12) through strap (11) and cover (6).
    b. Apply hand pressure to strap (11). Thread screws (12) into housing (10) until screw threads catch.
    c. Hand tighten screws (12).

30. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32 INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (8) AND TWO SCREWS (12) TO 35-45 in-lb (40-52 cmkg).

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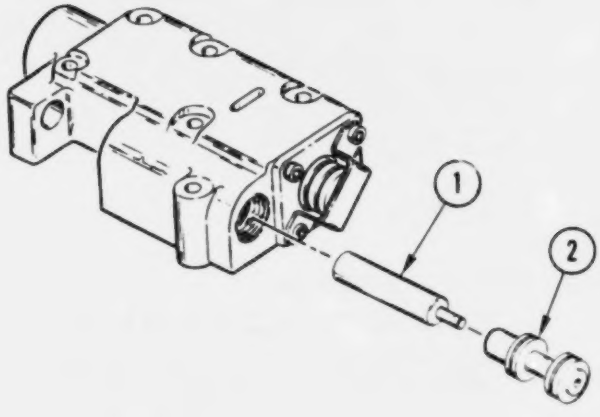
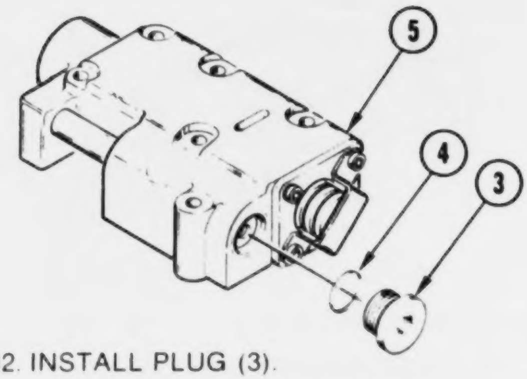


31. INSTALL DASHPOT (1) AND SLIDE (2).



32. INSTALL PLUG (3).
    a. Coat new preformed packing (4) with transmission oil.
    b. Install packing (4) on plug (3).
    c. Using 3/8-inch drive ratchet handle and 3/8-inch socket wrench attachment, install plug (3).
33. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 3/8-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (3) TO 30-45 ft-lb (4-6 mkg).
34. REMOVE HOUSING (5) FROM VISE.

END OF TASK

REPAIR COOLANT AND TIME DELAY VALVE HOUSING INSERTS

DESCRIPTION

This task gives the location and size of inserts used in the coolant and time delay valve housing. Part or item numbers of tools, kits, and inserts, and working dimensions are given below. For procedures to remove, repair, and install inserts, refer to Replace Inserts. See page 2-171.

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Industrial goggles — (Item 39, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Portable electric drill — (Item 58, App C)
- Screw threading set — (Item 65, App C)
- Socket wrench set — (Item 88, App C)
- Transmission insert repair kit — (Item 103, App C)
- Compressed air source, 30 psi (207 kPa) maximum

Materials/Parts:

- Sealant compound — (Item 11, App B)
- Transmission oil — (Item 12, App B)

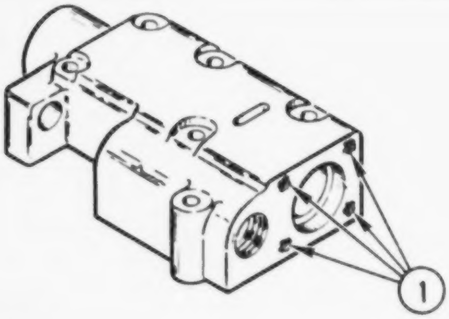
Personnel Required:

- Track Veh Rep 63H10

Equipment Conditions:

- Coolant and time delay valve housing on workbench. See page 4-408.

REPAIR



STANDARD AND OVERSIZE INSERT REPLACEMENT INFORMATION

Index No.	Insert No. STANDARD OVERSIZE	Removal Tool No.	Step Drill No.	Thread Cutting Tap Tool No.	Swage Tool No. With Swage Tool Stop No.	Counterbore Depth	Drive Wrench No.	Installation Depth Below Surface
1	M45932/1-9L SR192L	SR19R		SR19T	RZA12788-1 RZA12656-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)
	M45932/3-9L SRW192L	SRW19R	SRW19D	SRW19T	RZA12789-1 RZA12791-1	.082-.092 in. (2.08-2.34 mm)	SR19WA	.02-.03 in. (.51-.76 mm)

END OF TASK

Section XVI. FIRST RANGE RELAY VALVE ASSEMBLY

TASK INDEX

Task	Page	Task	Page
Replace First Range Relay Valve Assembly	4-418	Repair First Range Relay Valve Assembly	4-427

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE FIRST RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-418). Install (page 4-421).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Machinist's vise — (Item 47, App C)
Socket wrench adapter — (Item 75, App C)
Socket wrench attachment — (Item 80, App C)
Socket wrench attachment — (Item 82, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Lockwire — (Item 5, App B)
Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)
Internal wrench bolt
Preformed packing (4)
Preformed packing
Socket head cap screw (3)
Gasket

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

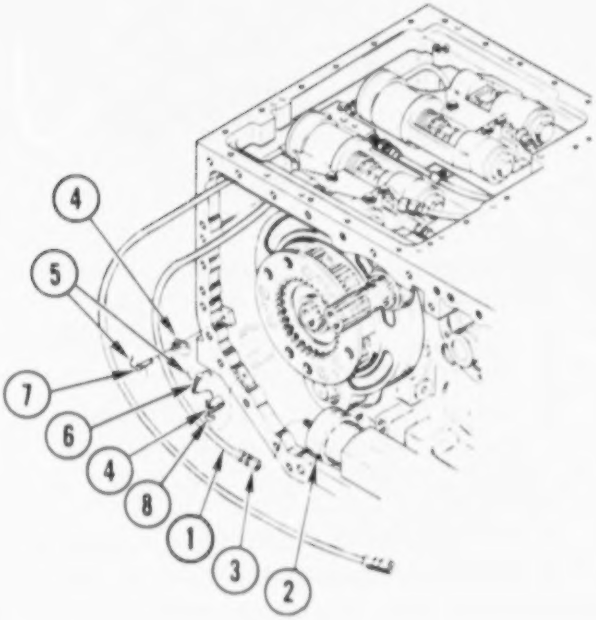
Transmission mounted on tip-over stand. See page 2-144.

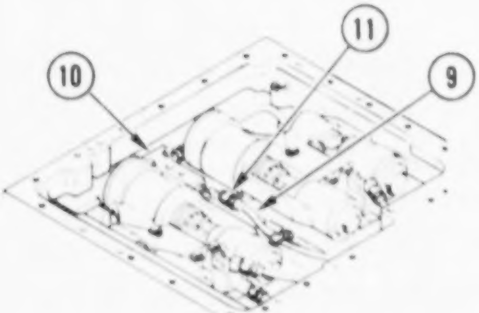
REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

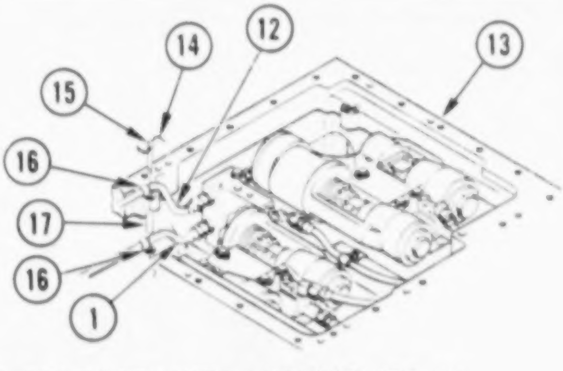
8. DISCONNECT HOSE ASSEMBLY (1) FROM HYDRAULIC ACCUMULATOR (2).
   a. Unscrew nut (3).

9. REMOVE TWO LOOP CLAMPS (4).
   a. Using wire-twister pliers, remove and discard two lockwires (5).
   b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, remove bolt (6), screw (7), and sleeve spacer (8). Discard screw and bolt.
   c. Spread open and pull off two clamps (4).





10. DISCONNECT HOSE ASSEMBLY (9) FROM FIRST RANGE RELAY VALVE ASSEMBLY (10).
    a. Unscrew nut (11).



11. RELEASE HOSE ASSEMBLIES (1) AND (12) FROM TRANSMISSION HOUSING (13).
    a. Using wire-twister pliers, remove and discard lockwire (14).
    b. Using 3/8-inch drive ratchet handle, 6-inch extension, and 5/32-inch socket wrench attachment, remove screw (15), clamp (16), sleeve spacer (17), and second clamp (16). Discard screw.
    c. Release hose assemblies (1) and (12).

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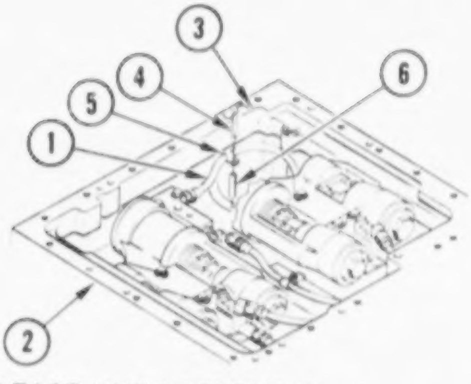
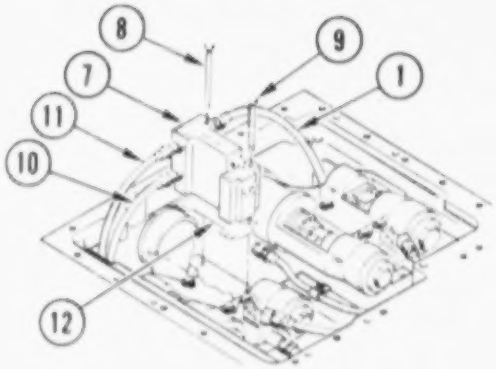


12. RELEASE HOSE ASSEMBLY (1) FROM TRANSMISSION HOUSING (2).

    a. Using wire-twister pliers, remove and discard lockwire (3).

    b. Using 3/8-inch drive ratchet handle, 6-inch extension, and 5/32-inch socket wrench attachment, remove screw (4), clamp (5), and sleeve spacer (6). Discard screw.

    c. Release hose assembly (1).

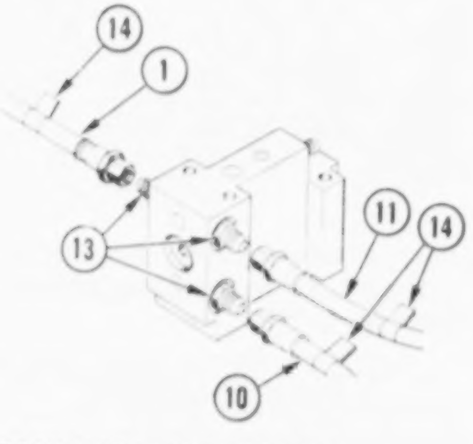


13. REMOVE VALVE ASSEMBLY (7).

    a. Using 3/8-inch drive ratchet handle and 7/16-inch socket, remove two screws (8) and two screws (9).

    b. Lift out valve assembly (7) with hoses (10), (11), and (1).

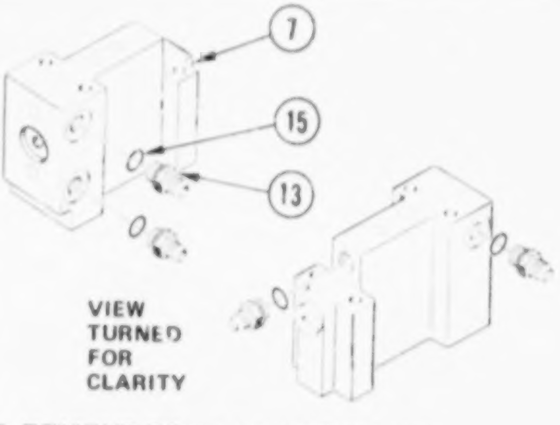
    c. Remove and discard relay valve assembly gasket (12).



14. DISCONNECT HOSE ASSEMBLIES (10), (11), AND (1) FROM ADAPTERS (13).

    a. Place identification tags (14) on hose assemblies (10), (11), and (1).

    b. Disconnect hose assemblies.



15. REMOVE FOUR ADAPTERS (13) FROM VALVE ASSEMBLY (7).

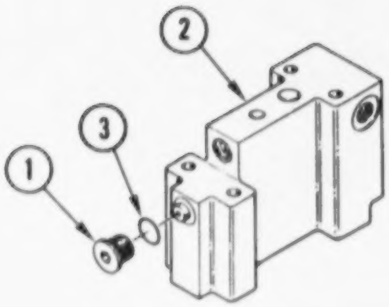
    a. Place valve assembly (7) in vise.

    b. Remove four adapters (13).

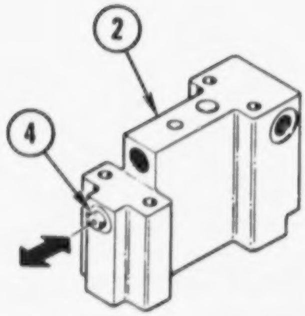
    c. Remove and discard four preformed packings (15).

16. INSPECT MAIN HOUSING INSERTS. See page 2-5.

    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



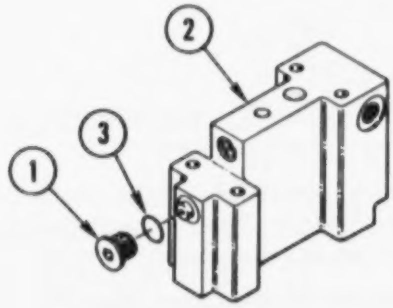
17. REMOVE PLUG (1) FROM HOUSING (2).
    a. Using 3/8-inch drive rachet handle and 1/4-inch socket wrench attachment, remove plug (1).
    b. Remove and discard preformed packing (3).



18. INSPECT DIRECTIONAL CONTROL SLIDE (4) FOR FREE MOVEMENT IN HOUSING (2).
    a. Push slide (4) in and out of housing (2).
    b. If slide (4) is stuck in housing (2), go to step 19. If not, go to step 21.
19. REPAIR FIRST RANGE RELAY VALVE ASSEMBLY, page 4-427.
20. PLACE HOUSING (2) IN VISE AND GO TO STEP 23.

INSTALL

21. INSTALL PLUG (1) IN HOUSING (2), IF REMOVED.
    a. Coat new preformed packing (3) with transmission oil.
    b. Install preformed packing (3) on plug (1).
    c. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (1).
22. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 20-25 ft-lb (3 mkg).



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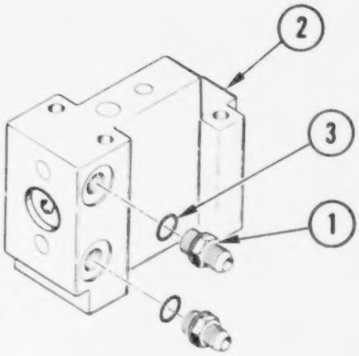
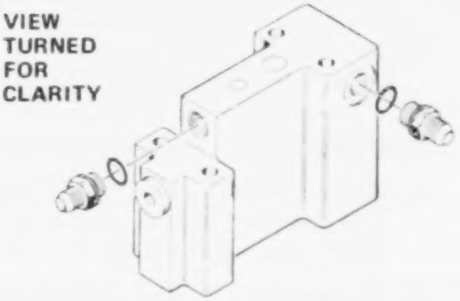
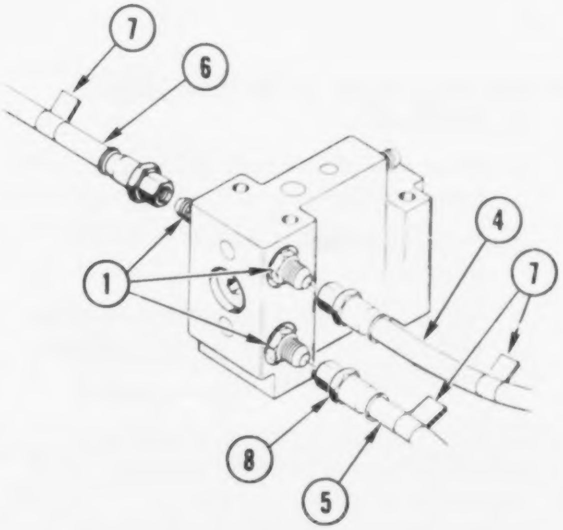


23. INSTALL FOUR ADAPTERS (1) IN HOUSING (2).
    a. Coat four new preformed packings (3) with transmission oil.
    b. Install packing (3) on each of four adapters (1).
    c. Install four adapters (1) in housing (2).

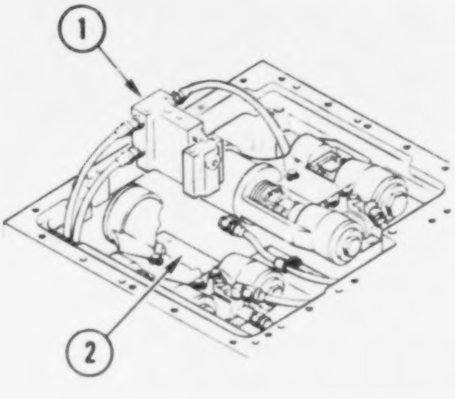


24. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE FOUR ADAPTERS (1) TO 125-135 in-lb (144-155 cmkg).
    a. Remove housing (2) from vise.



25. CONNECT HOSE ASSEMBLIES (4), (5), AND (6) TO ADAPTERS (1).
    a. Using identification tags (7) for position, connect hose assemblies (4),(5), and (6) to adapters (1).
    b. Remove identification tags (7).

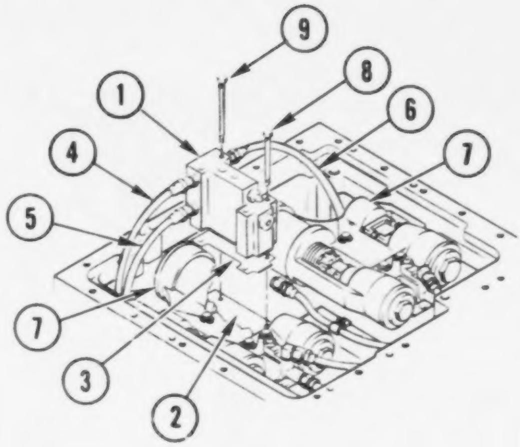
26. USING 3/8-INCH DRIVE TORQUE WRENCH, AND 9/16-INCH CROWFOOT, TORQUE THREE HOSE NUTS (8) TO 125-135 in-lb (144-155 cmkg).



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

27. CLEAN GASKET MOUNTING SURFACE OF VALVE ASSEMBLY (1) AND HOUSING (2).
    a. Use wiping rag dampened with cleaning solvent.

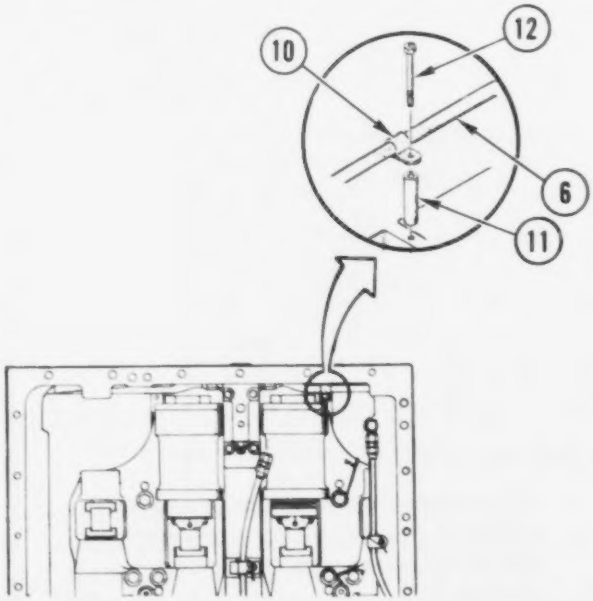


28. INSTALL VALVE ASSEMBLY (1).
    a. Position new gasket (3) and valve assembly (1) on housing (2).
    b. Feed hose assemblies (4), (5), and (6) behind two actuator assemblies (7).
    c. Install two short screws (8) and two long screws (9).

29. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (8) AND TWO SCREWS (9) TO 120-145 in-lb (138-167 cmkg).

30. SECURE HOSE ASSEMBLY (6).
    a. Install clamp (10) and spacer (11).
    b. Using 3/8-inch drive ratchet handle, 6-inch extension, and 5/32-inch socket wrench attachment, install new screw (12).

31. USING 3/8-INCH DRIVE TORQUE WRENCH, 6-INCH EXTENSION, AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (12) TO 35-45 in-lb (40-52 cmkg).



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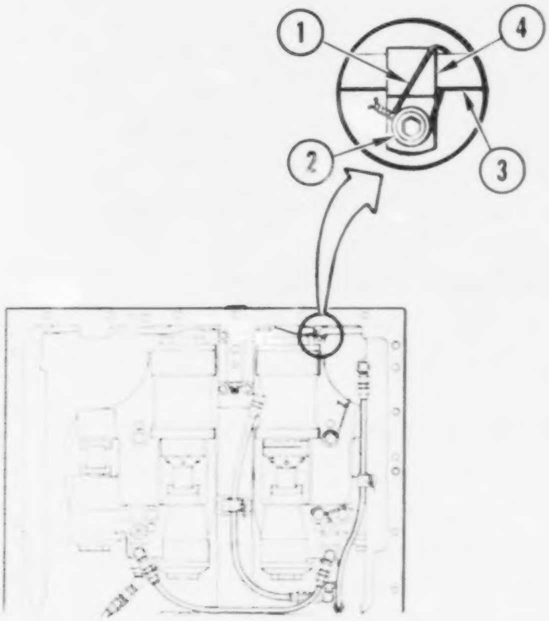
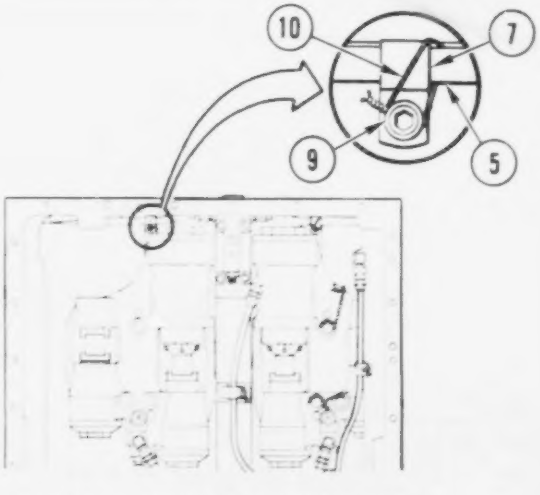


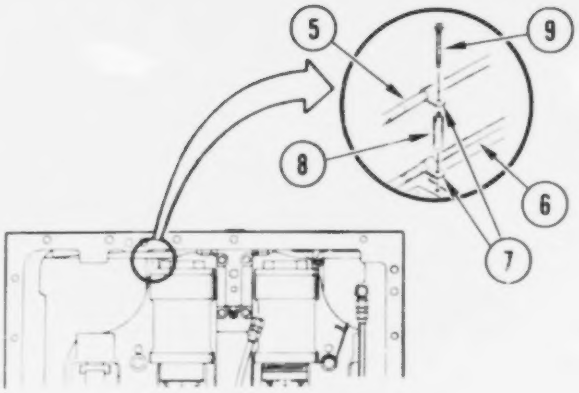
32. INSTALL NEW LOCKWIRE (1).

a. Using wire-twister pliers, install lockwire (1) through screw (2), around hose assembly (3), and clamp (4).



35. INSTALL NEW LOCKWIRE (10).

a. Using wire-twister pliers, install lockwire (10) through screw (9) and around hose assembly (5) and clamp (7).

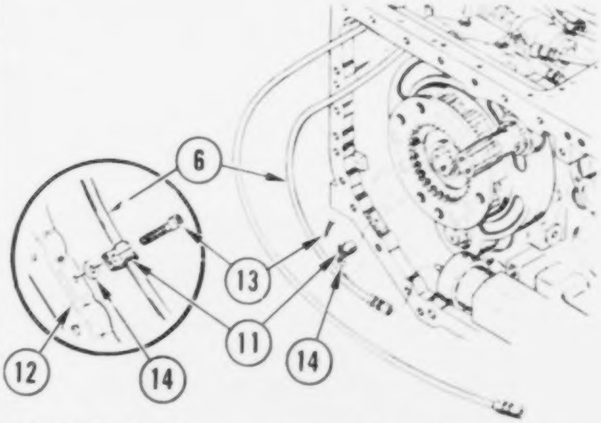


33. SECURE TWO HOSE ASSEMBLIES (5) AND (6).

a. Install two clamps (7) and spacer (8).

b. Using 3/8-inch drive ratchet handle, 6-inch extension, and 5/32-inch socket wrench attachment, install new screw (9) through clamp (7), spacer (8), and second clamp (7).

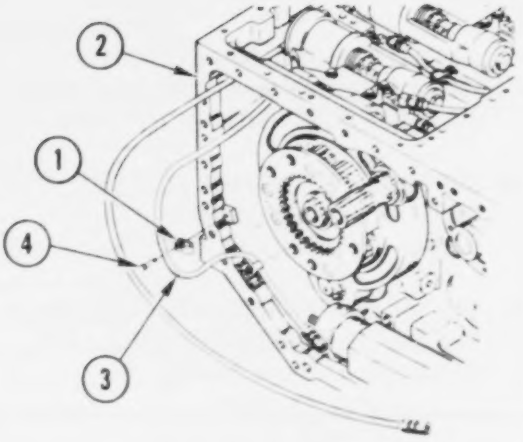
34. USING 3/8-INCH DRIVE TORQUE WRENCH, 6-INCH EXTENSION, AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SCREW (9) TO 35-45 in-lb (40-52 cmkg).



36. SECURE CLAMP (11) ON HOUSING (12).

a. Install clamp (11) on hose assembly (6).

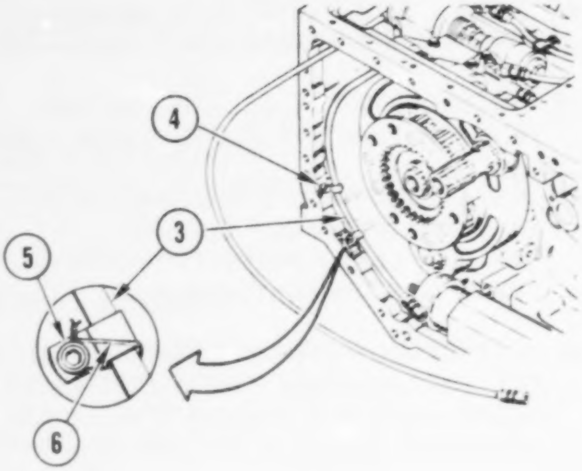
b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new long bolt (13) through clamp (11), spacer (14), and housing (12).



37. SECURE CLAMP (1) ON HOUSING (2).

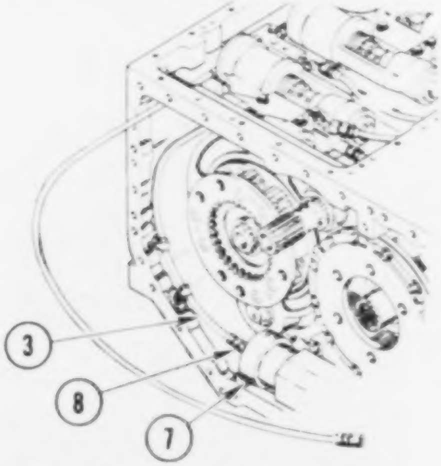
   a. Install clamp (1) on hose assembly (3).

   b. Position clamp (1) against housing (2). Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install new short screw (4) through clamp and housing.



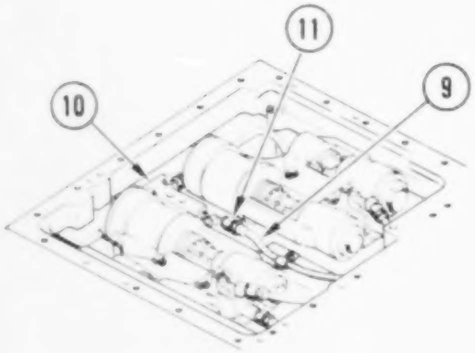
38. USING 3/8-INCH DRIVE TORQUE WRENCH AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE BOLT (5) AND SCREW (4) TO 35-45 in-lb (40-52 cmkg).

39. USING WIRE-TWISTER PLIERS, INSTALL NEW LOCKWIRE (6) THROUGH BOLT (5) AND AROUND HOSE ASSEMBLY (3). REPEAT FOR SCREW (4).



40. CONNECT HOSE ASSEMBLY (3) TO HYDRAULIC ACCUMULATOR (7).

41. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (8) TO 125-135 in-lb (144-155 cmkg).



42. CONNECT HOSE ASSEMBLY (9) TO VALVE ASSEMBLY (10).

43. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (11) TO 125-135 in-lb (144-155 cmkg).

GO TO NEXT PAGE

44. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

45. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

46. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

47. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

48. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

49. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

50. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR FIRST RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-427). Assemble (page 4-429).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Machinist's vise — (Item 47, App C)
- Micrometer caliper set — (Item 52, App C)
- Small hole gage set — (Item 72, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 82, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Transmission oil — (Item 12, App B)
- Preformed packing (2)

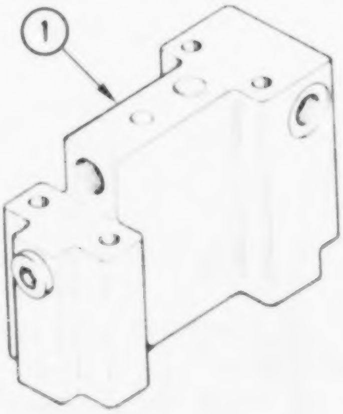
Personnel Required:

- Track Veh Rep 63H10

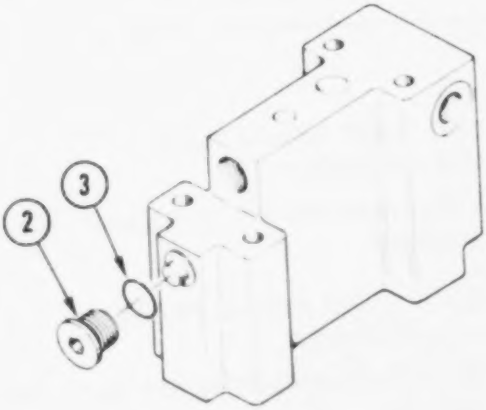
Equipment Conditions:

- First range relay valve assembly on workbench. See page 4-418.

DISASSEMBLE



1. PLACE FIRST RANGE RELAY VALVE ASSEMBLY (1) IN VISE.



2. REMOVE MACHINE THREAD PLUG (2).
   a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (2).
   b. Remove and discard preformed packing (3).

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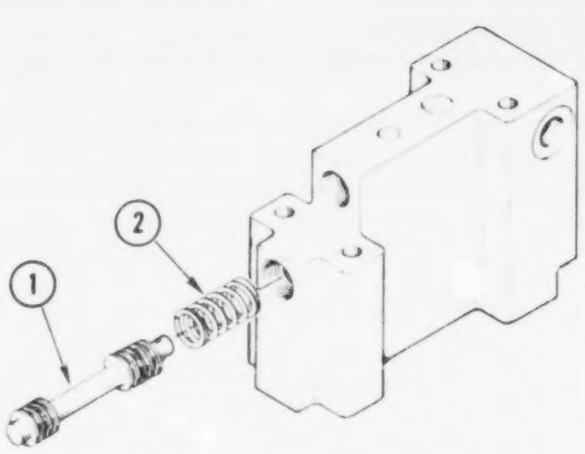
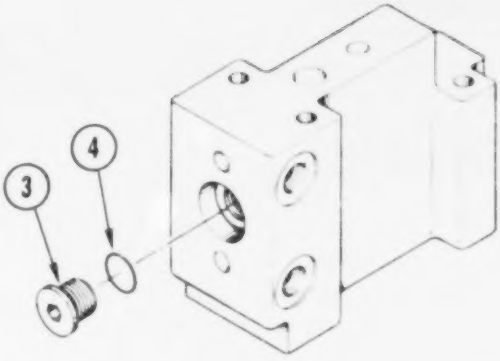


CAUTION

First range relay directional control slide and slide bore are precision fit parts. Do not drop, scratch, or nick slide. Equipment can be damaged.

3. REMOVE DIRECTIONAL CONTROL SLIDE (1) AND SPRING (2).



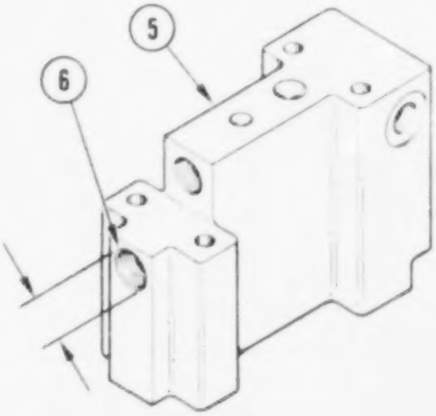
VIEW TURNED FOR CLARITY

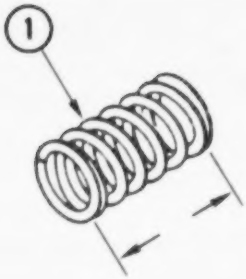
4. REMOVE MACHINE THREAD PLUG (3).
   a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (3).
   b. Remove and discard preformed packing (4).

5. CLEAN FIRST RANGE RELAY VALVE ASSEMBLY.
   a. Clean assembly and piece parts. See page 2-2.

6. INSPECT FIRST RANGE RELAY VALVE ASSEMBLY.
   a. Inspect assembly and piece parts. See page 2-5.

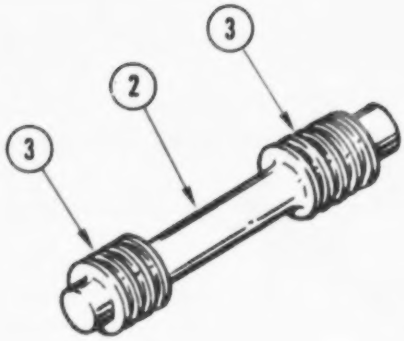
7. CHECK HOUSING (5).
   a. Using micrometer caliper set and small hole gage set, measure inside diameter of bore (6) in housing (5). Do not measure threads.
   b. If measurement of bore (6) is more than 0.5008 inch (12.720 mm), replace valve assembly and go to END OF TASK. If not, go to step 8.





8. CHECK SPRING (1).

   a. Using indicator caliper, measure free length of spring (1). Replace spring if length is less than 0.90 inch (22.9 mm).



9. CHECK SLIDE (2).

   a. Using micrometer caliper set, measure two diameters (3) of slide (2).

   b. Replace slide (2) if either measurement is less than 0.4992 inch (12.680 mm).

ASSEMBLE

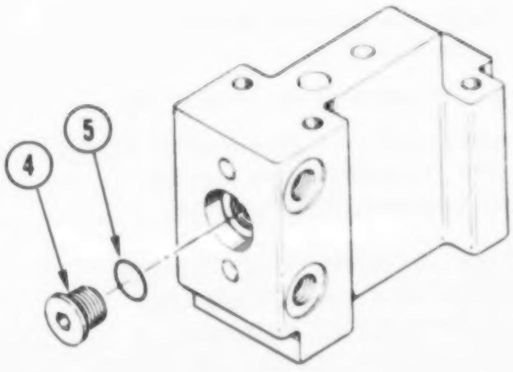
10. INSTALL PLUG (4).

    a. Coat new packing (5) with transmission oil.

    b. Install packing (5) on plug (4).

    c. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (4).

11. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (4) TO 20-25 ft-lb (3 mkg).



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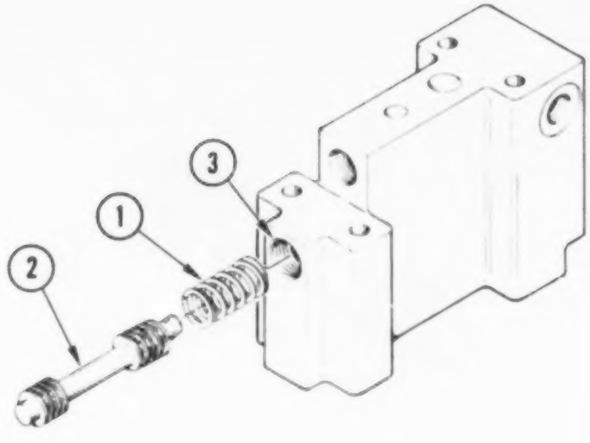
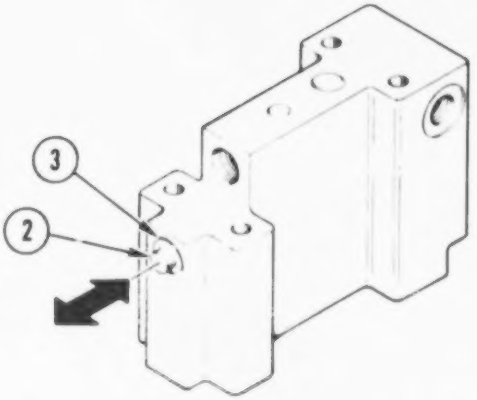
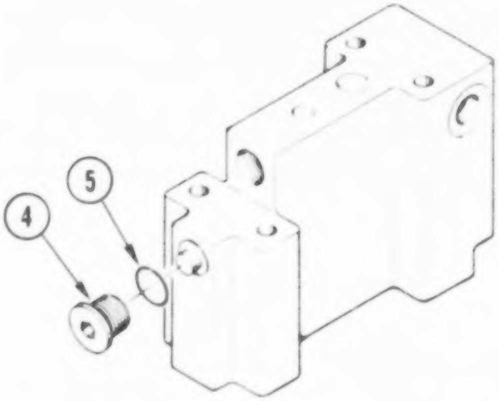


12. INSTALL SPRING (1) AND SLIDE (2) WITH LONG END FIRST, IN HOUSING BORE (3).

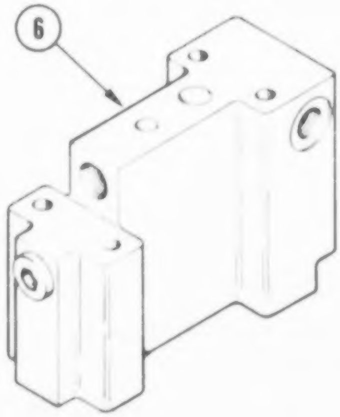


13. CHECK THAT SLIDE (2) MOVES FREELY IN BORE (3).
    a. Push slide (2) in and out of bore (3) several times.
    b. If slide (2) moves freely, go to step 14. If not, go to step 3.



14. INSTALL PLUG (4).
    a. Coat new packing (5) with transmission oil.
    b. Install packing (5) on plug (4).
    c. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (4).

15. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (4) TO 20-25 ft-lb (3 mkg).



16. REMOVE VALVE ASSEMBLY (6) FROM VISE.

END OF TASK

Section XVII. SECOND RANGE BRAKE ASSEMBLIES

TASK INDEX

Task	Page	Task	Page
Replace Second Range Brake Assemblies	4-432	Repair Second Range Single Disk Brakes	4-441

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE SECOND RANGE BRAKE ASSEMBLIES

DESCRIPTION

This task covers: Remove (page 4-432). Install (page 4-436).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Micrometer caliper set —
(Item 52, App C)
Micrometer depth gage — (Item 54, App C)
Socket wrench attachment —
(Item 80, App C)
Socket wrench set — (Item 89, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)
Wire-twister pliers — (Item 107, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Lockwire — (Item 5, App B)
Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)
Performed packing (2)
Self-locking bolt (10)
Socket head cap screw (2)

Personnel Required:

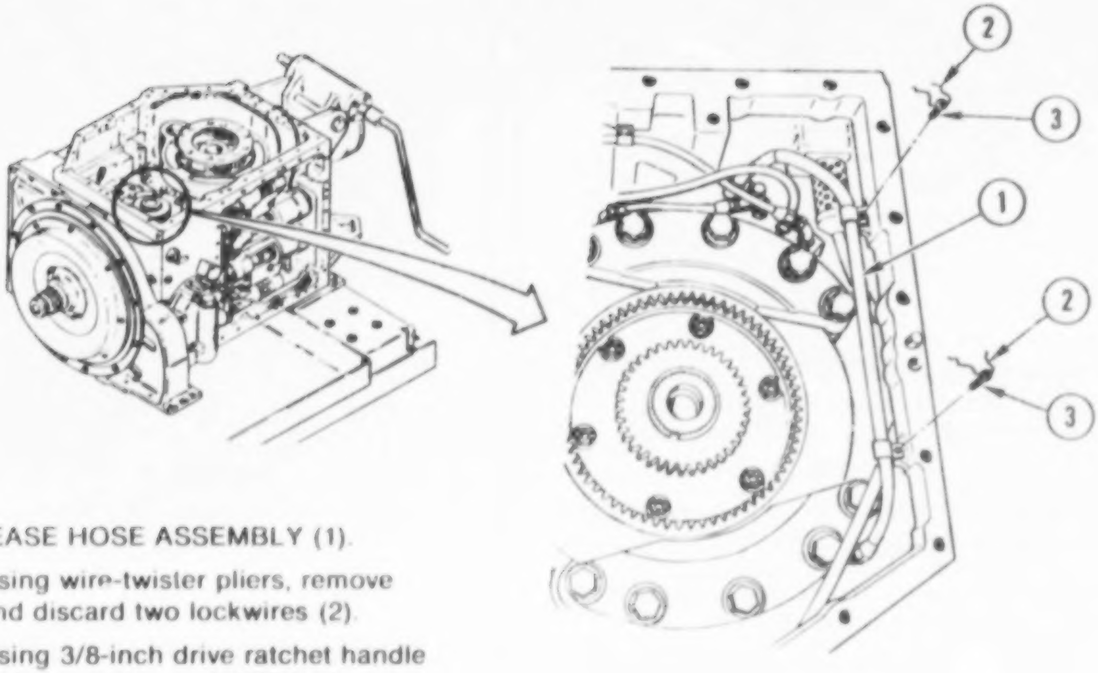
Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

REMOVE

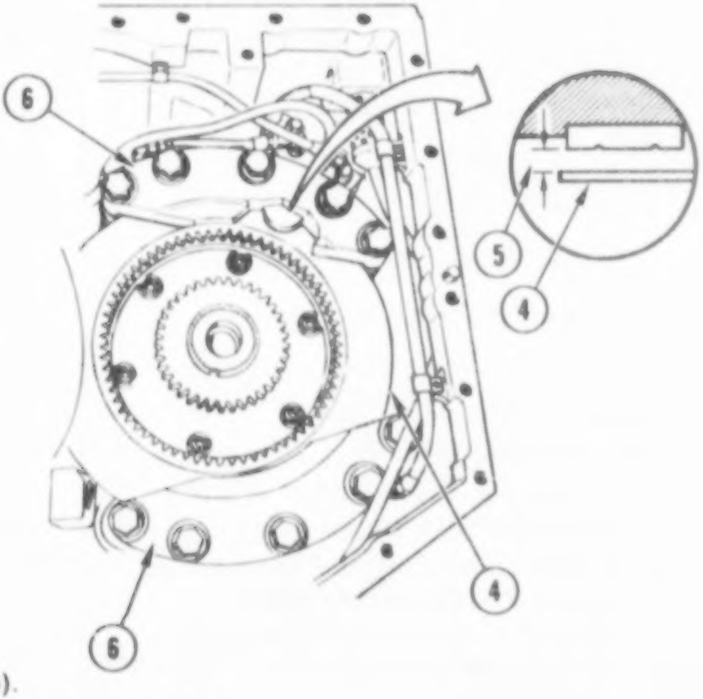
1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
8. REMOVE CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.
9. REMOVE HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.



10. RELEASE HOSE ASSEMBLY (1).

   a. Using wire-twister pliers, remove and discard two lockwires (2).

   b. Using 3/8-inch drive ratchet handle with extension and 5/32-inch socket wrench attachment, remove two screws (3). Discard screws.



11. CHECK CLEARANCE OF RING GEAR (4).

   a. Using feeler gage, measure clearance (5) between two pads on each second range brake (6) and ring gear (4).

   b. Note if any clearance (5) is not 0.021-0.060 inch (0.533-1.524 mm).

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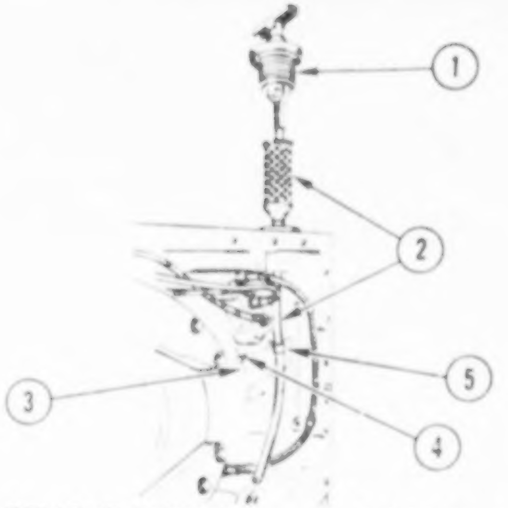
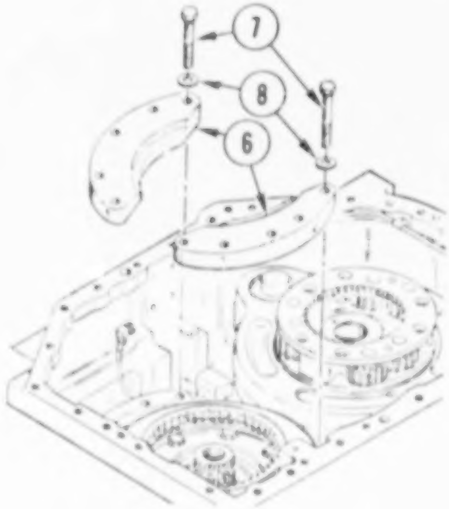


12. REMOVE DIPSTICK (1) AND DIPSTICK TUBE ASSEMBLY (2).

a. Using wire-twister pliers, remove and discard lockwire (3).

b. Using 3/8-inch drive ratchet handle with extension and 7/16-inch socket, remove screw (4).

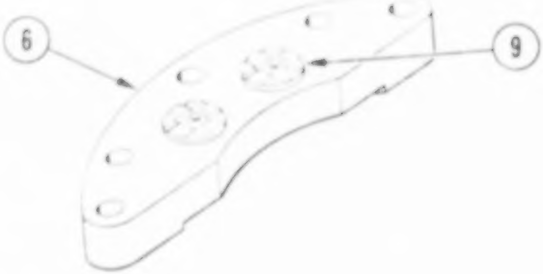
c. Remove dipstick (1) and dipstick tube assembly (2) with clamp (5).



13. REMOVE TWO SECOND RANGE BRAKE ASSEMBLIES (6).

a. Remove 10 self-locking bolts (7) and washers (8). Discard bolts.

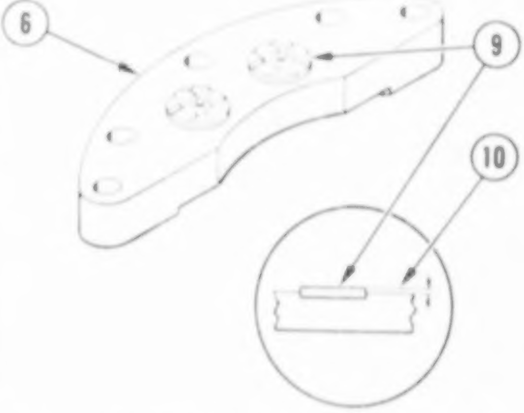
b. Remove two brake assemblies (6).



14. INSPECT TWO PADS (9) ON EACH BRAKE ASSEMBLY (6).

a. Inspect two pads (9) on each brake assembly (6) for damage. See page 2-5.

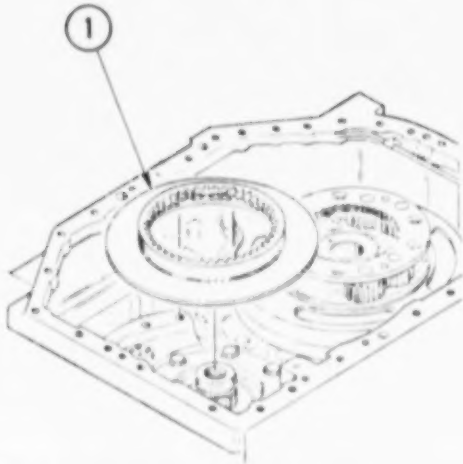
b. If no brake pads (9) are damaged, go to step 15. If any brake pad is damaged, replace two brake assemblies (6) and go to step 16.



15. CHECK TWO BRAKE ASSEMBLIES (6).

a. Using depth gage, measure height (10) of two pads (9) on each brake assembly (6).

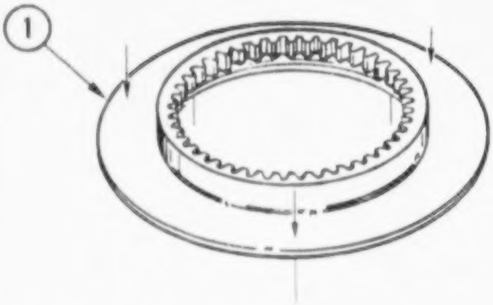
b. Replace two brake assemblies (6) if any measurement is less than 0.100 inch (2.54 mm).



16. INSPECT RING GEAR (1).

   a. Remove ring gear (1) and inspect both sides for damage. See page 2-5.

   b. If ring gear (1) is damaged, replace it and go to step 18. If not, go to step 17.

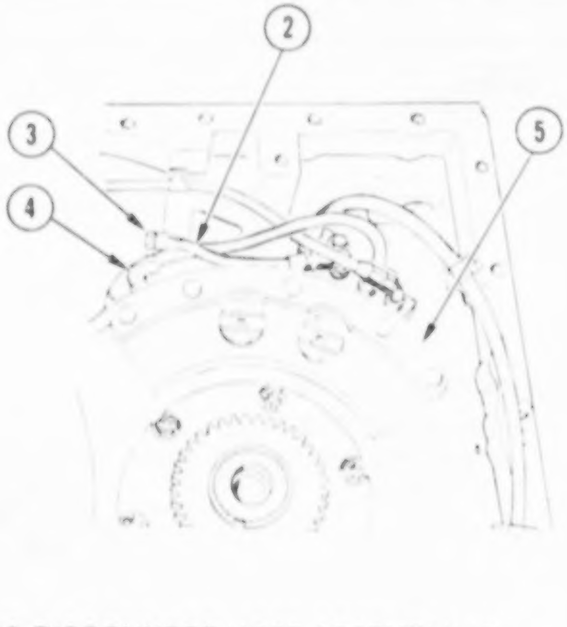


17. CHECK RING GEAR (1).

   a. Using micrometer caliper set, measure thickness of ring gear (1) in three places. Replace ring gear if any thickness is less than 0.190 inch (4.83 mm) and go to step 18.

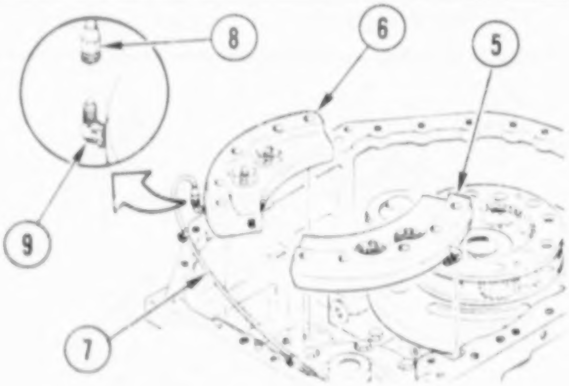
   b. Using a flat surface and feeler gage, check ring gear (1) for warpage. Check inside and outside edges in three places.

   c. Replace ring gear (1) if warpage is greater than 0.010 inch (0.25 mm).



18. DISCONNECT HOSE ASSEMBLY (2).

   a. Disconnect hose nut (3) from hose to boss elbow (4) on second range single disk brake (5).



19. REMOVE BRAKES (5) AND (6).

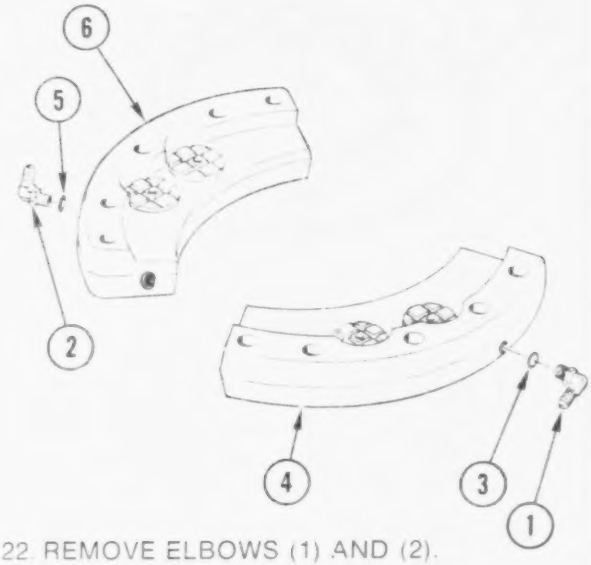
20. DISCONNECT HOSE ASSEMBLY (7).

   a. Disconnect hose nut (8) from elbow (9) on brake (6).

21. INSPECT MAIN HOUSING INSERTS. See page 2-5.

   a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

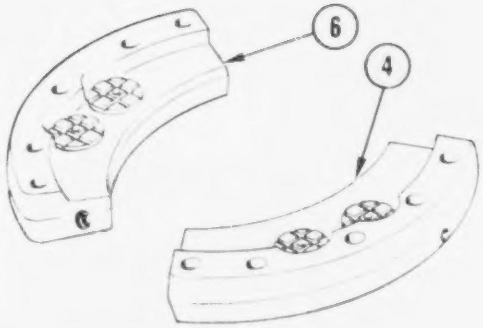
GO TO NEXT PAGE



22. REMOVE ELBOWS (1) AND (2).

   a. Remove elbow (1) and preformed packing (3) from brake (4). Discard packing.

   b. Remove elbow (2) and preformed packing (5) from brake (6). Discard packing.

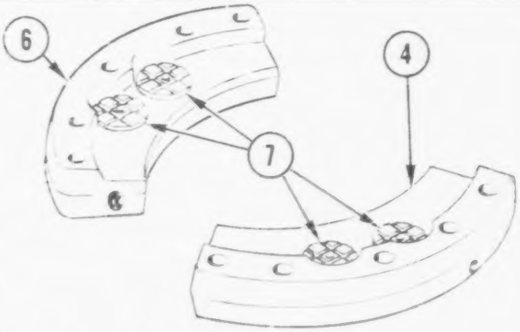


23. IF MEASUREMENT IN STEP 11 WAS WITHIN 0.021-0.060 INCHES (0.533-1.524 mm), GO TO STEP 27. IF NOT, GO TO STEP 24.

24. IF SECOND RANGE BRAKE ASSEMBLIES WERE REPLACED IN STEPS 14 OR 15, GO TO STEP 25. IF NOT, GO TO STEP 27.

25. REPAIR SINGLE DISK BRAKES (4) AND (6). See task REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

26. GO TO STEP 29.



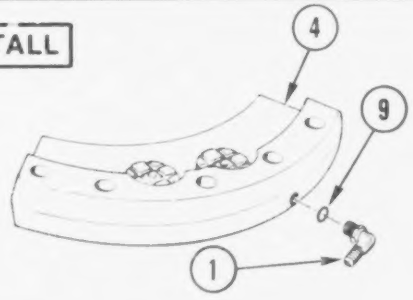
27. INSPECT TWO PADS (7) ON EACH BRAKE (4) AND (6).

   a. Inspect two pads (7) on each brake (4) and (6) for damage. See page 2-5.

   b. If pads (7) are damaged, go to step 28. If not, go to step 29.

28. REPAIR SINGLE DISK BRAKES (4) AND (6). See task REPAIR SECOND RANGE SINGLE DISK BRAKES, page 4-441.

INSTALL

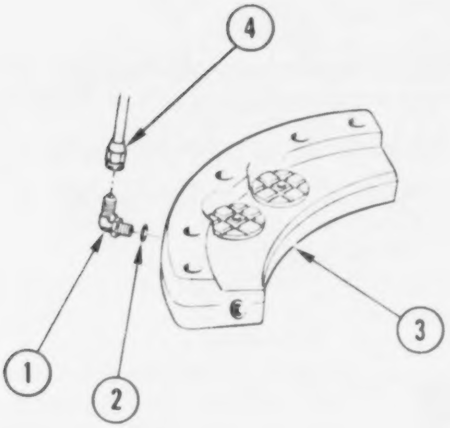


29. INSTALL ELBOW (1).

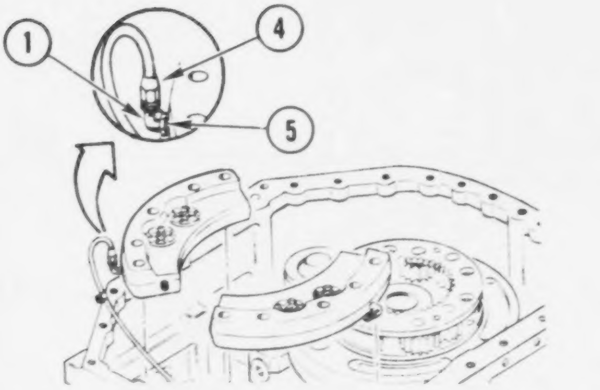
   a. Coat new preformed packing (3) with transmission oil. Install packing on elbow (1).

   b. Screw elbow (1) into brake housing (4). Hand tighten until captive washer makes firm contact with brake housing.

   c. Unscrew elbow (1) to position needed for connection of hose assembly to brake housing (4).



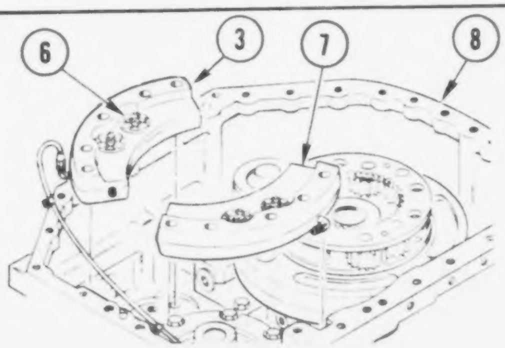
30. INSTALL ELBOW (1).
    a. Coat new preformed packing (2) with transmission oil. Install packing on elbow (1).
    b. Screw elbow (1) into brake housing (3). Hand tighten until captive washer makes firm contact with brake housing.
    c. Unscrew elbow (1) to position needed for connection to hose nut (4).



31. CONNECT HOSE NUT (4) TO ELBOW (1).

32. HOLD ELBOW (1). USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (5) TO 125-135 in-lb (144-155 cmkg).

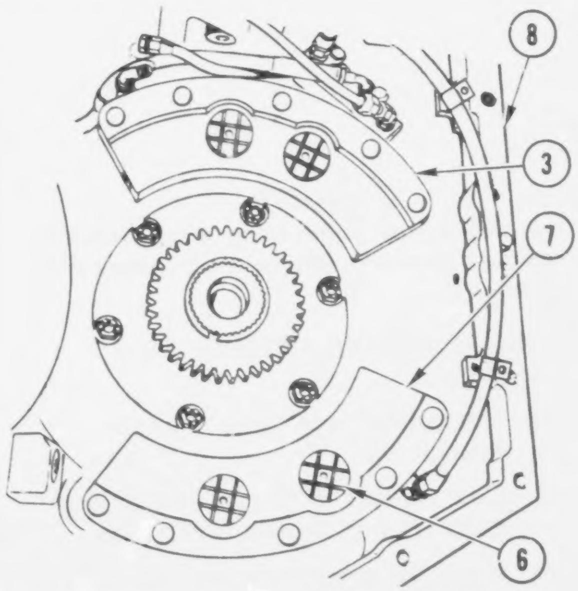
33. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (4) TO 125-135 in-lb (144-155 cmkg).



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

34. CLEAN BRAKE PADS (6) AND MATING SURFACES OF SINGLE DISK BRAKES (3) AND (7) AND TRANSMISSION HOUSING (8).
    a. Use wiping rag dampened with cleaning solvent.



35. POSITION SINGLE DISK BRAKES (3) AND (7) IN HOUSING (8).
    a. Coat brake pads (6) with transmission oil.

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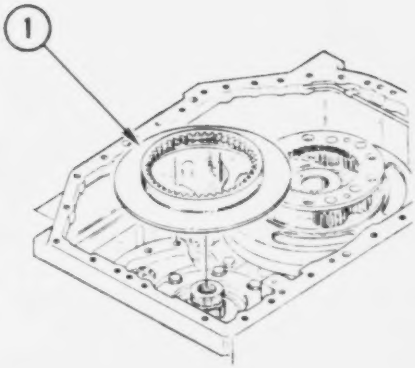
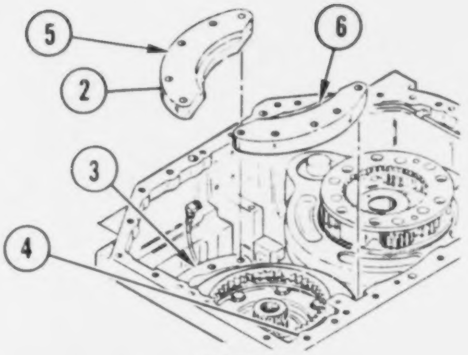


36. INSTALL RING GEAR (1).



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

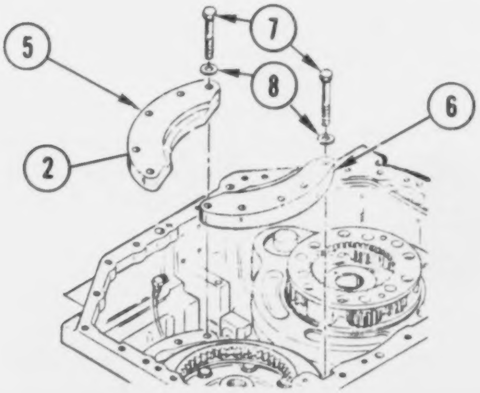
37. CLEAN BRAKE PADS (2) AND MATING SURFACES OF SINGLE DISK BRAKES (3) AND (4), AND SECOND RANGE BRAKE ASSEMBLIES (5) AND (6).
    a. Use wiping rag dampened with cleaning solvent.

CAUTION

Do not install self-locking bolts without sealing compound. Damge to equipment can occur.

38. INSTALL BRAKE ASSEMBLIES (5) AND (6).
    a. Coat brake pads (2) with transmission oil.
    b. Coat threads of 10 new self-locking bolts (7) with sealant compound.
    c. Install 10 washers (8) and bolts (7).

39. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 10 BOLTS (7) TO 150-160 ft-lb (21-22 mkg).



CAUTION

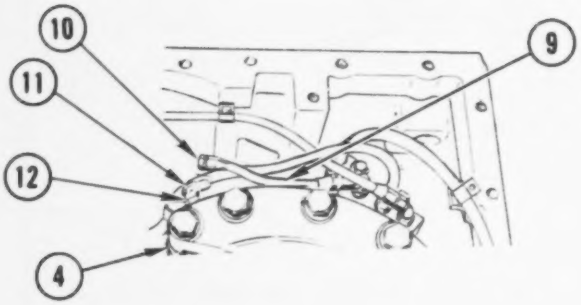
Do not allow hose assemblies to interfere with other parts. Damage to equipment may result.

40. CONNECT HOSE ASSEMBLY (9).

    a. Connect hose nut (10) to elbow (11) on brake (4).

41. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (12) TO 125-135 in-lb (144-155 cmkg).

42. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (10) TO 125-135 in-lb (144-155 cmkg).



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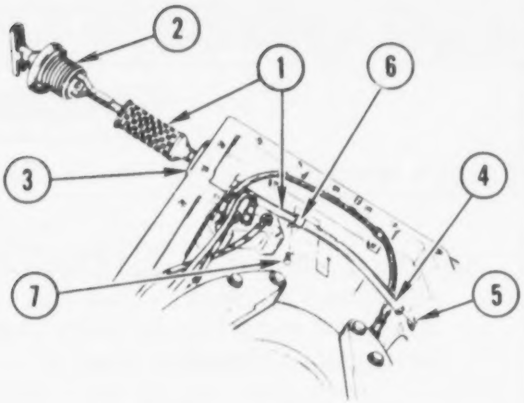
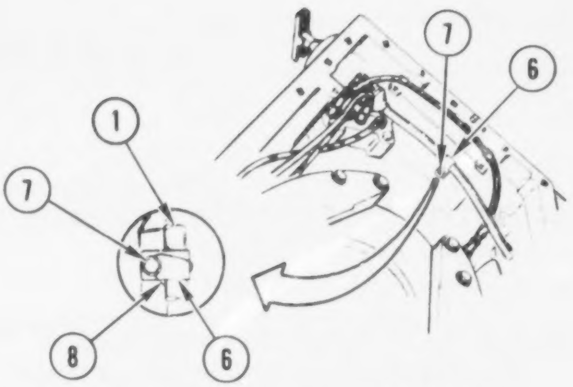


43. INSTALL DIPSTICK TUBE ASSEMBLY (1) AND DIPSTICK (2).

a. Feed dipstick tube assembly (1) through hole (3). Place lower end (4) of dipstick tube in hole (5).

b. Install dipstick (2).

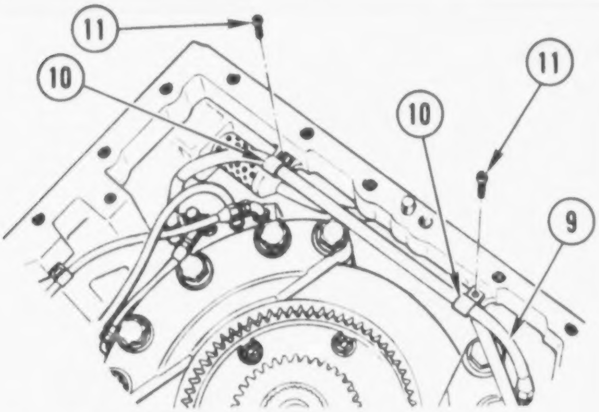
c. Position flat side of clamp (6) away from main housing and install screw (7).



44. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION, AND 7/16-INCH SOCKET, TORQUE SCREW (7) TO 110-120 in-lb (127-138 cmkg).

45. INSTALL NEW LOCKWIRE (8).

a. Using wire-twister pliers, install lockwire (8) through screw (7) and around dipstick tube assembly (1) and clamp (6).

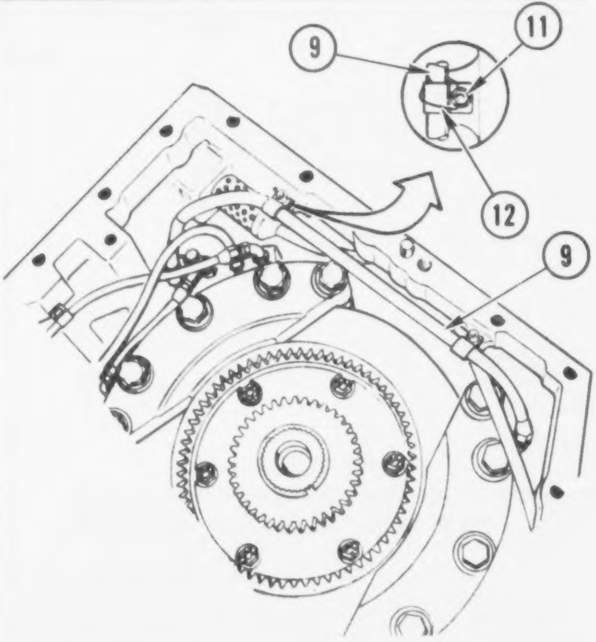


46. SECURE HOSE ASSEMBLY (9).

a. Position two clamps (10).

b. Using 3/8-inch drive ratchet handle and 5/32-inch socket wrench attachment, install two new screws (11).

47. USING 3/8-INCH DRIVE TORQUE WRENCH WITH EXTENSION AND 5/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE TWO SCREWS (11) TO 35-45 in-lb (40-52 cmkg).



48. INSTALL TWO NEW LOCKWIRES (12).

a. Using wire-twister pliers, install lockwires (12) through two screws (11) and around hose assembly (9).

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49. INSTALL HYDRAULIC ACCUMULATOR. See task REPLACE HYDRAULIC ACCUMULATOR, page 4-448.

50. INSTALL CROSS SHAFT ASSEMBLY. See task REPLACE CROSS SHAFT ASSEMBLY, page 4-458.

51. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

52. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

53. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

54. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

55. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

56. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

57. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR SECOND RANGE SINGLE DISK BRAKES

DESCRIPTION

This task covers: Disassemble (page 4-441). Assemble (page 4-443).

INITIAL SETUP

Tools:

- General mechanic's tool kit automotive — (Item 33, App C)
- Micrometer caliper set — (Item 52, App C)
- Socket wrench attachment — (Item 81, App C)
- Socket wrench set — (Item 89, App C)
- Telescoping gage set — (Item 93, App C)
- Torque wrench — (Item 99, App C)

Materials/Parts:

- Transmission oil — (Item 12, App B)
- Disk brake parts kit

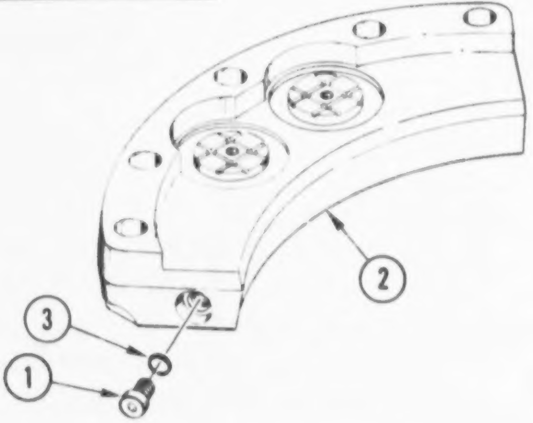
Personnel Required:

- Track Veh Rep 63H10

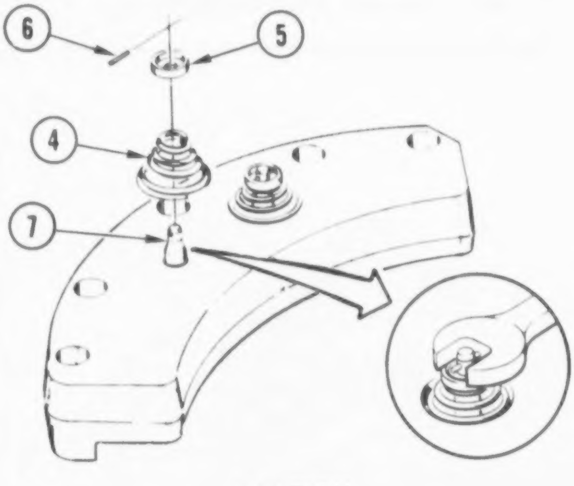
Equipment Conditions:

- Second range single disk brakes on workbench. See page 4-432.

DISASSEMBLE



1. REMOVE PLUG (1) FROM EACH SECOND RANGE SINGLE DISK BRAKE (2).
   a. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, unscrew plug (1).
   b. Remove and discard preformed packing (3).
   c. Repeat steps 1a and 1b for remaining plug (1).



CAUTION

Shaft collar is installed under spring pressure. Do not lose parts when removing pin.

2. REMOVE SPRING (4).
   a. Using 9/16-inch open end wrench, press shaft collar (5) and spring (4).
   b. Remove pin (6) from brake piston rod (7).
   c. Slowly release pressure on spring (4). Remove collar (5) and spring.

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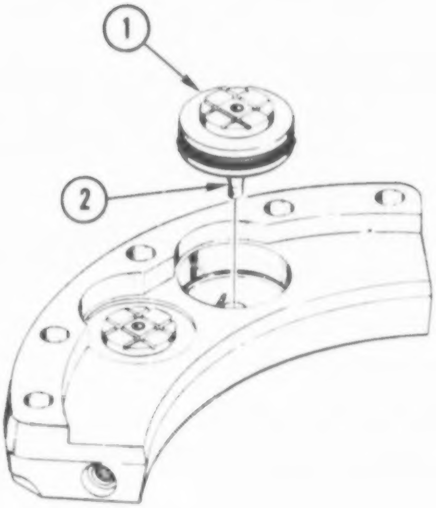
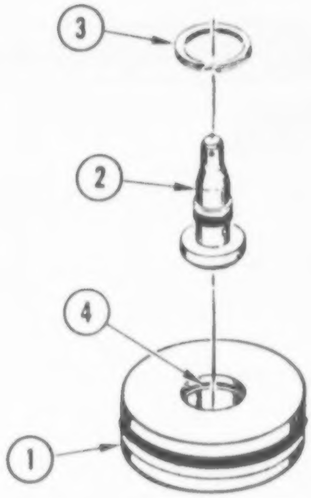
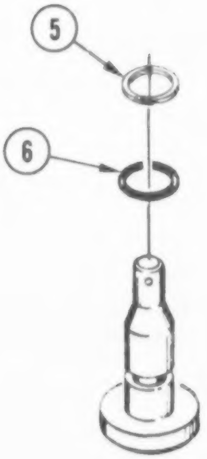


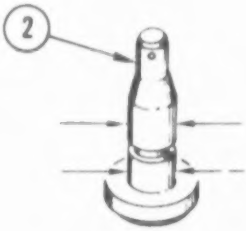
3. REMOVE PISTON ASSEMBLY (1) WITH BRAKE PISTON ROD (2).



4. REMOVE PISTON ASSEMBLY (1) FROM ROD (2).
   a. Remove retaining ring (3) from groove (4) in piston assembly (1). Discard retaining ring.
   b. Remove and discard piston assembly (1).



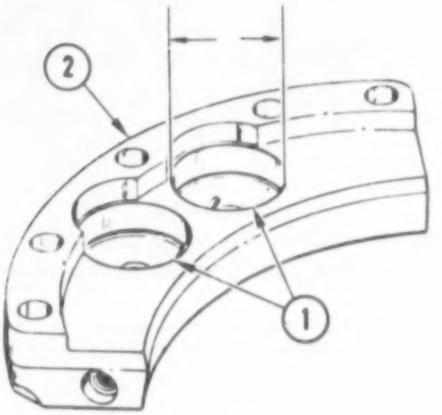
5. REMOVE AND DISCARD PACKING RETAINER (5) AND PREFORMED PACKING (6).



6. CHECK ROD (2).
   a. Using micrometer caliper set, measure diameter of rod (2) in two places.
   b. Replace rod (2) if either measurement is less than 0.418 inch (10.62 mm).
   c. Replace rod (2) if scored.

7. REPEAT STEPS 2 THROUGH 6 FOR REMAINING THREE RODS (2).

8. CHECK TWO PISTON BORES (1).
   a. Using micrometer caliper set and telescoping gage set, measure two inside diameters of piston bores (1).
   b. Replace brake piston housing (2) if either measurement is greater than 2.122 inches (53.90 mm).



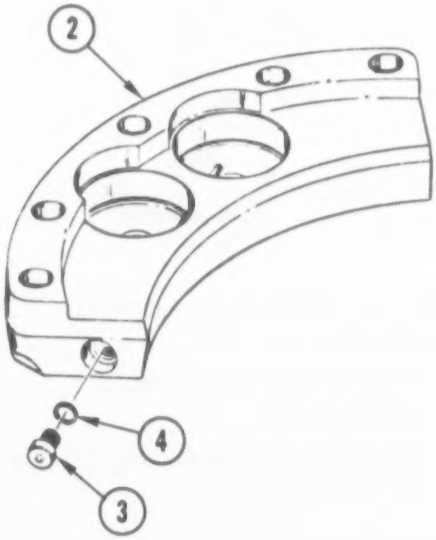
9. REPEAT STEP 8 FOR REMAINING BRAKE PISTON HOUSING (2).

10. CLEAN SECOND RANGE SINGLE DISK BRAKES.
    a. Clean housings (2) and piece parts. See page 2-2.

11. INSPECT SECOND RANGE SINGLE DISK BRAKES.
    a. Inspect housings (2) and piece parts. See page 2-5.

ASSEMBLE

12. INSTALL ONE PLUG (3) IN EACH HOUSING (2).
    a. Coat new preformed packing (4) with transmission oil.
    b. Install packing (4) on plug (3).
    c. Using 3/8-inch drive ratchet handle and 3/16-inch socket wrench attachment, install plug (3).
    d. Repeat steps 12a through 12c for remaining plug (3).



13. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/16-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUGS (3) TO 110-120 in-lb (127-138 cmkg).

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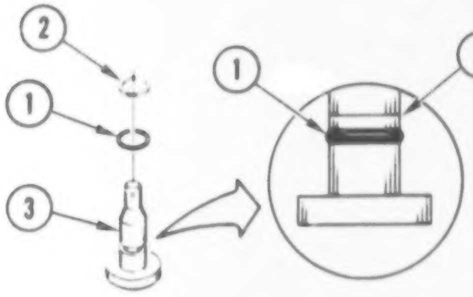
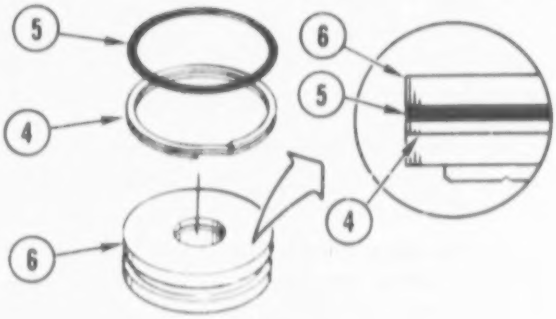


CAUTION

Packing retainer must be installed toward narrow end of rod. Damage to equipment can occur.

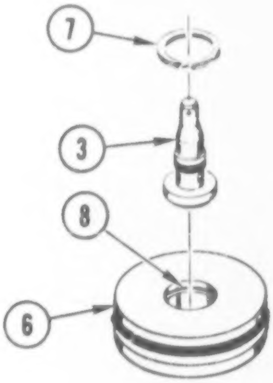
14. INSTALL NEW PREFORMED PACKING (1) AND NEW PACKING RETAINER (2) ON ROD (3).
    a. Coat new packing (1) with transmission oil.
    b. Install packing (1) and new packing retainer (2) on rod (3).



CAUTION

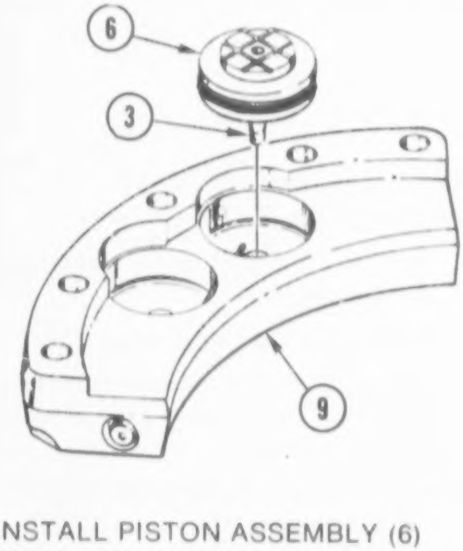
Packing retainer must be installed toward pad end of piston assembly. Damage to equipment can occur.

15. INSTALL NEW PACKING RETAINER (4), AND NEW PREFORMED PACKING (5) ON NEW PISTON ASSEMBLY (6).
    a. Coat new packing (5) with transmission oil.
    b. Install new packing retainer (4) and packing (5) on new piston assembly (6).



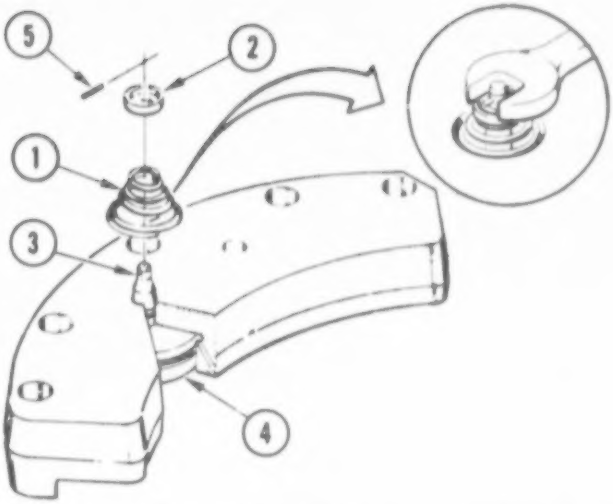
16. INSTALL ROD (3) IN PISTON ASSEMBLY (6).
    a. Position rod (3) in piston assembly (6).
    b. Press new retaining ring (7) into groove (8).

17. REPEAT STEPS 14, 15, AND 16 FOR REMAINING THREE RODS (3) AND PISTON ASSEMBLIES (6).



18. INSTALL PISTON ASSEMBLY (6) WITH ROD (3) IN HOUSING (9).
    a. Coat piston assembly (6) and rod (3) with transmission oil.
    b. Press piston assembly (6) with rod (3) into housing (9).

19. INSTALL AND SECURE SPRING (1).
    a. Place spring (1) and collar (2) on rod (3). Install collar with cupped side up.
    b. Hold piston assembly (4) in place. Using 9/16-inch open-end wrench, press collar (2) until pin hole in rod (3) is visible.
    c. Install pin (5) through hole in rod (3).
    d. Release pressure on spring (1).
20. REPEAT STEPS 18 AND 19 FOR REMAINING THREE RODS (3) AND PISTON ASSEMBLIES (4).



END OF TASK

Section XVIII. HYDRAULIC ACCUMULATOR

TASK INDEX

Task	Page	Task	Page
Replace Hydraulic Accumulator	4-448	Repair Hydraulic Accumulator	4-452

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

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REPLACE HYDRAULIC ACCUMULATOR

DESCRIPTION

This task covers: Remove (page 4-448). Install (page 4-449).

INITIAL SETUP

Tools:

Crowfoot attachment — (Item 20, App C)
Crowfoot attachment — (Item 22, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench adapter —
(Item 75, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Petrolatum — (Item 7, App B)

Materials/Parts: (cont)

Transmission oil — (Item 12, App B)
Wiping rag — (Item 13, App B)
Lock washer (4)
Transmission repair kit

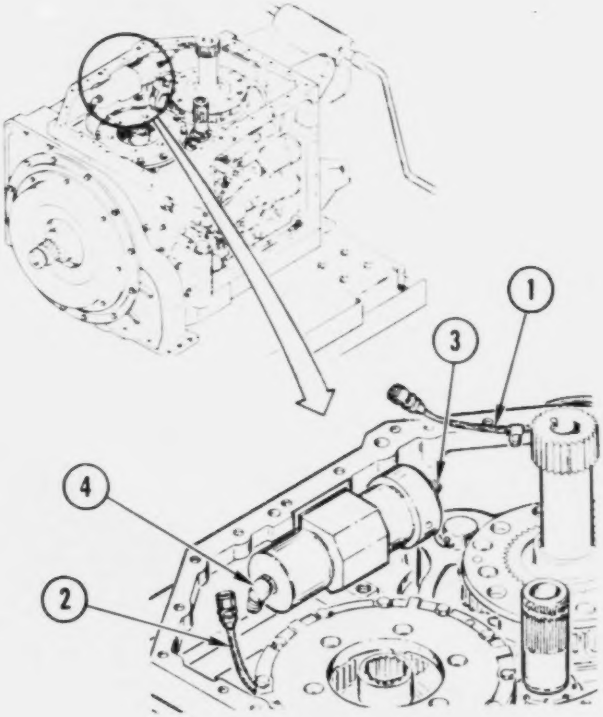
Personnel Required:

Track Veh Rep 63H10

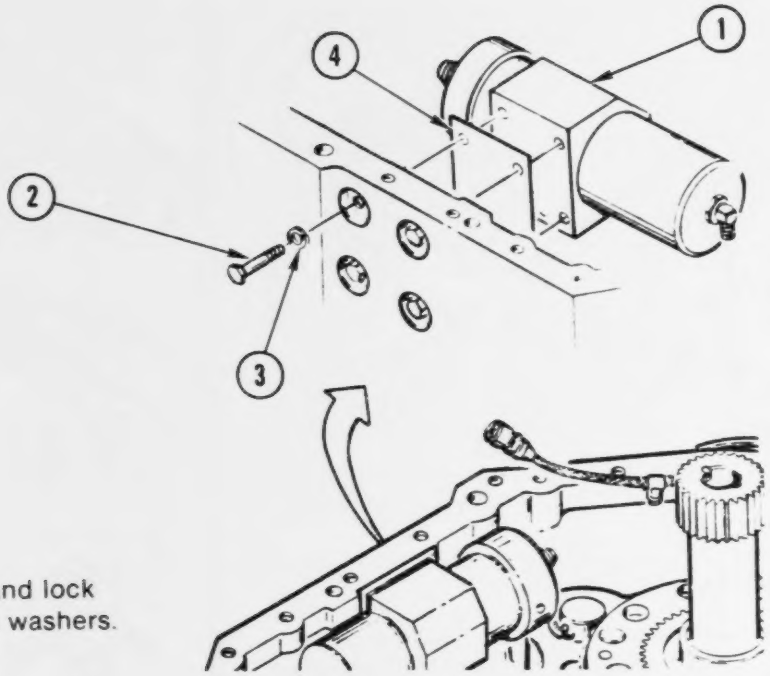
Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

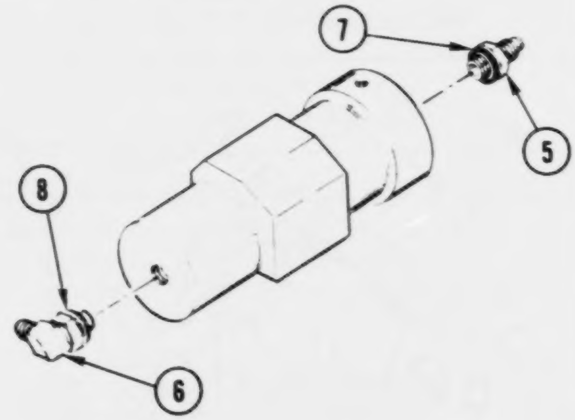
REMOVE



1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. DISCONNECT HOSE ASSEMBLIES (1) AND (2).
   a. Disconnect hose (1) from adapter (3).
   b. Disconnect hose (2) from 90 degree elbow (4).

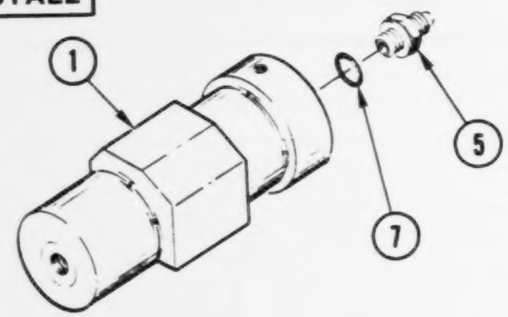


5. REMOVE HYDRAULIC ACCUMULATOR (1).
   a. Remove four screws (2) and lock washers (3). Discard lock washers.
   b. Lift out accumulator (1).
   c. Remove and discard accumulator housing gasket (4).



6. REMOVE ADAPTER (5) AND ELBOW (6).
   a. Unscrew adapter (5).
   b. Remove and discard preformed packing (7).
   c. Unscrew elbow (6).
   d. Remove and discard preformed packing (8).

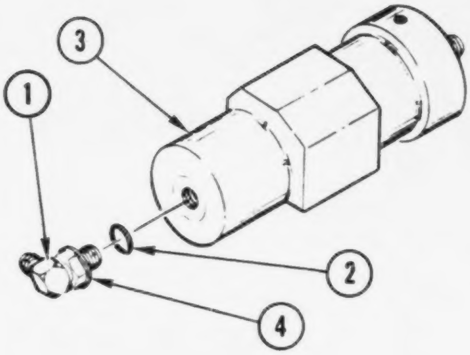
INSTALL



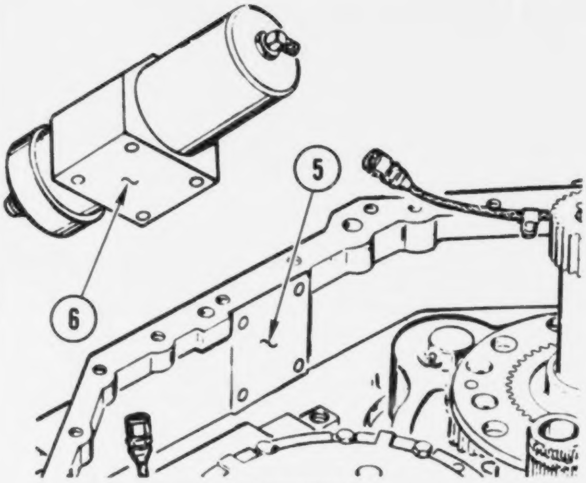
7. INSTALL ADAPTER (5).
   a. Coat new preformed packing (7) with transmission oil.
   b. Install packing (7) on adapter (5).
   c. Install adapter (5) in accumulator (1).

8. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (5) TO 125-135 in-lb (144-155 cmkg).

GO TO NEXT PAGE



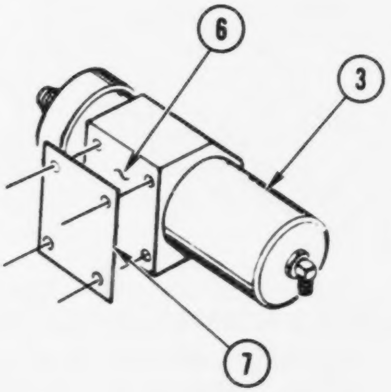
9. INSTALL ELBOW (1).
   a. Coat new preformed packing (2) with transmission oil. Install packing on elbow (1).
   b. Screw elbow (1) into accumulator (3). Hand tighten until captive washer (4) makes firm contact with accumulator housing.



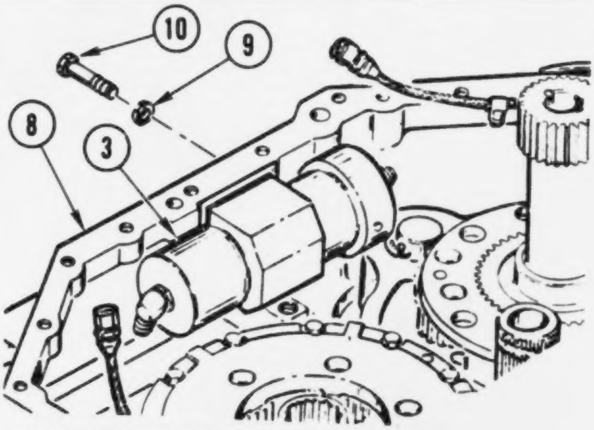
WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

10. CLEAN MATING SURFACES (5) AND (6).
    a. Use wiping rag dampened with cleaning solvent.

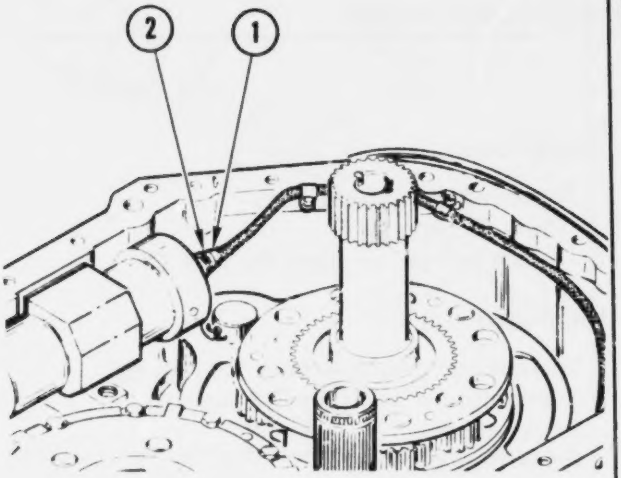


11. INSTALL NEW GASKET (7).
    a. Coat new gasket (7) with petrolatum.
    b. Position gasket (7) on surface (6) of accumulator (3).



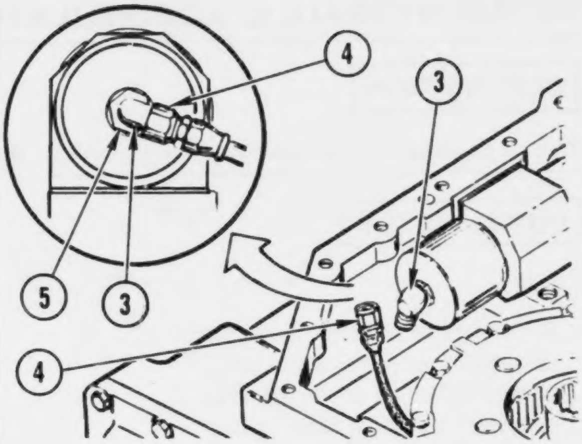
12. INSTALL ACCUMULATOR (3).
    a. Mount accumulator (3) on housing (8).
    b. Install four new lock washers (9) and screws (10).

13. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SCREWS (10) TO 25-30 ft-lb (3-4 mkg).



14. CONNECT HOSE NUT (1) TO ADAPTER (2).

15. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (1) TO 125-135 in-lb (144-155 cmkg).



16. POSITION ELBOW (3) FOR HOSE NUT (4) CONNECTION.

17. CONNECT HOSE NUT (4) TO ELBOW (3).

18. HOLD ELBOW (3). USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 11/16-INCH CROWFOOT, TORQUE LOCKNUT (5) TO 20-22 ft-lb (3 mkg).

19. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 11/16-INCH CROWFOOT, TORQUE HOSE NUT (4) TO 20-22 ft-lb (3 mkg).

---

20. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

21. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

22. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR HYDRAULIC ACCUMULATOR

DESCRIPTION

This task covers: Disassemble (page 4-452). Assemble (page 4-454).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder — (Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Inside/outside indicator caliper — (Item 41, App C)
Leather gloves — (Item 42, App C)
Machinist's vise — (Item 47, App C)
Mechanical puller kit — (Item 51, App C)
Retaining-ring pliers — (Item 61, App C)
Slide hammer adapter — (Item 69, App C)
Socket wrench attachment — (Item 78, App C)
Socket wrench set — (Item 88, App C)
Thermal drying oven — (Item 94, App C)

Tools: (cont)

Threaded die and tap set — (Item 95, App C)
Torque wrench — (Item 98, App C)

Materials/Parts:

Sealant compound—(Item 11, App B)
Transmission oil—(Item 12, App B)
Encased seal
Preformed packing

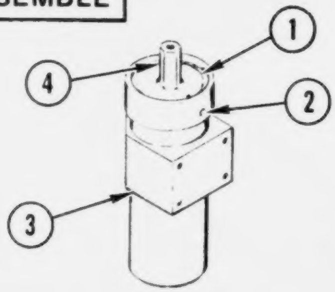
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Hydraulic accumulator on workbench. See page 4-448.

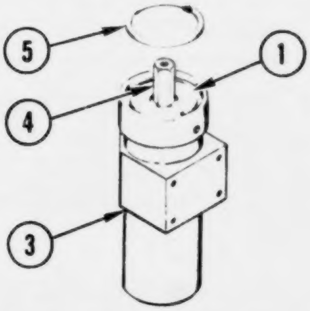
DISASSEMBLE



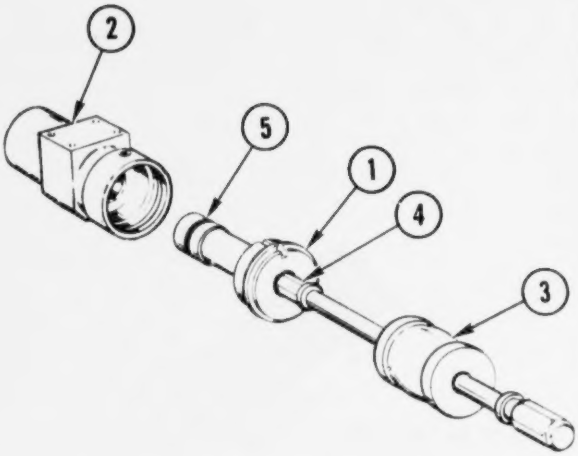
NOTE
Screw will not come all the way out of assembly.

1. FREE ACCUMULATOR PLUG (1).
   a. Turn setscrew (2) out of assembly (3) as far as it will go. Do not force setscrew.

2. SCREW SLIDE HAMMER ADAPTER (4) INTO PLUG (1) OF ASSEMBLY (3).

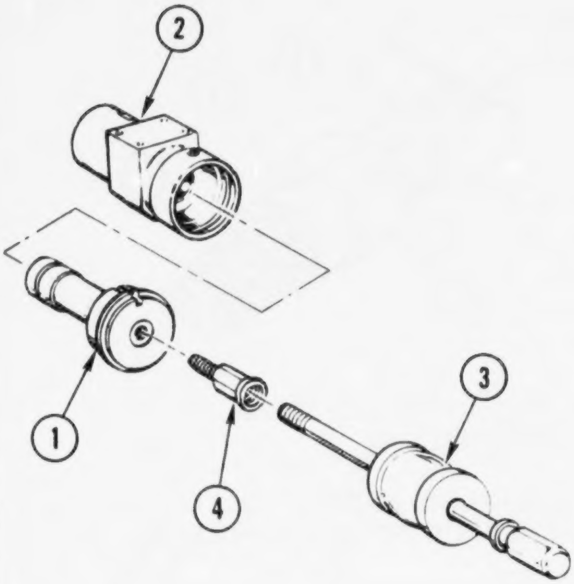


3. REMOVE RETAINING RING (5).
   a. Using arbor press, apply pressure to adapter (4), and push plug (1) away from retaining ring (5).
   b. Release pressure and remove assembly (3) from press.
   c. Using retaining-ring pliers, compress and pull retaining ring (5) from assembly.

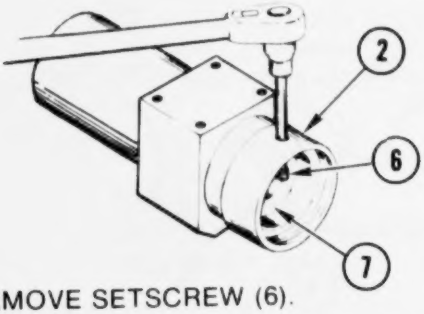


NOTE
Encased seal consists of a seal and two backup rings.

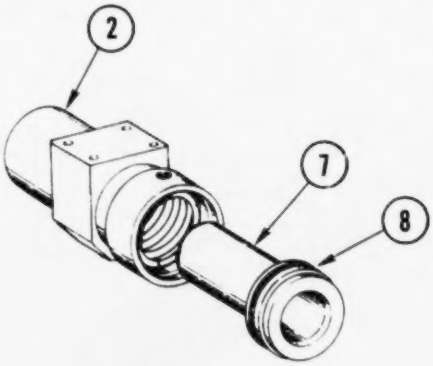
4. REMOVE PLUG (1).
   - a. Place assembly (2) in vise.
   - b. Thread slide hammer (3) into slide hammer adapter (4).
   - c. Pull out plug (1) from assembly (2).
   - d. Remove encased seal (5) from plug (1). Discard seal.



5. REMOVE ASSEMBLY (2) FROM VISE.
   - a. Remove slide hammer (3) from slide hammer adapter (4).
   - b. Remove slide hammer adapter (4) from plug (1).



6. REMOVE SETSCREW (6).
   - a. Push hydraulic accumulator piston (7) in and hold.
   - b. Using 1/4-inch ratchet handle and 3/32-inch socket wrench attachment, turn setscrew (6) in until it goes through wall of assembly (2).
   - c. Remove setscrew (6).



7. REMOVE PISTON (7).
   - a. Using plastic-faced hammer, tap assembly (2) to remove piston (7).
   - b. Remove and discard preformed packing (8) from piston (7).

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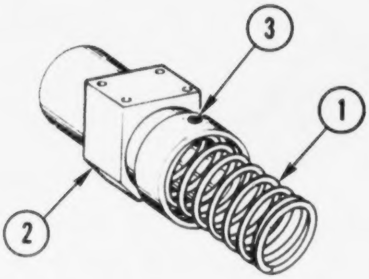
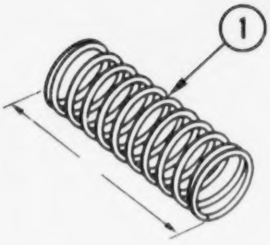


8. PULL SPRING (1) FROM ASSEMBLY (2).

9. USING DIE AND TAP SET, CLEAN THREADS OF SCREW HOLE (3).

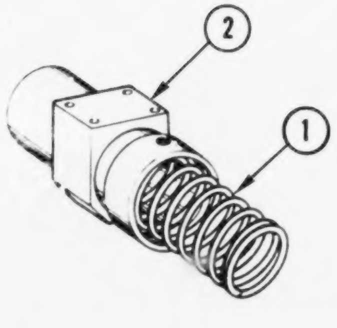
10. CLEAN HYDRAULIC ACCUMULATOR.
    a. Clean accumulator and piece parts. See page 2-2.

11. INSPECT HYDRAULIC ACCUMULATOR.
    a. Inspect accumulator and piece parts. See page 2-5.

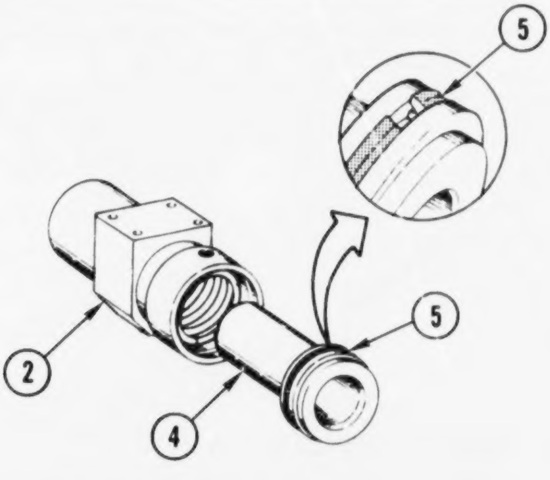


12. CHECK SPRING (1).
    a. Using indicator caliper, measure free length of spring (1). Replace spring if free length is less than 7.0 inches (177.8 mm).

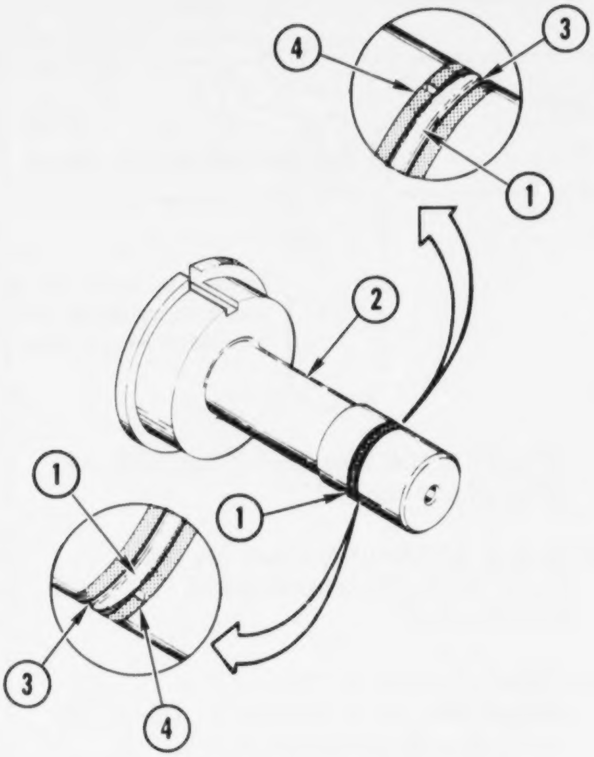
ASSEMBLE



13. INSERT SPRING (1) INTO ASSEMBLY (2).



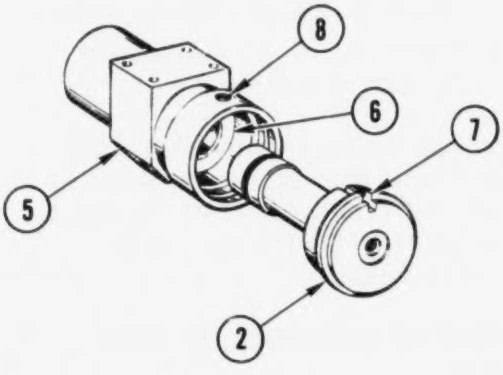
14. INSERT PISTON (4) INTO ASSEMBLY (2).
    a. Coat new packing (5) with transmission oil.
    b. Install packing (5) on piston (4).
    c. Insert piston (4) into assembly (2).



NOTE

Encased seal consists of a seal and two backup rings.

15. INSTALL NEW SEAL (1) ON PLUG (2).
    a. Coat new seal (1) with transmission oil.
    b. Position new seal (1) in groove (3).
    c. Install two backup rings (4) so that slots are about 180° apart.



WARNING

Do not handle hot or cold parts without protective gloves. Personnel can be injured.

CAUTION

Slot in plug must be alined with setscrew hole or plug can be damaged.

16. INSTALL PLUG (2).
    a. Place assembly (5) and piston (6) in oven. Heat to 300° F (150° C) for 30 minutes. Using gloves, remove from oven.
    b. Aline slot (7) in plug (2) with setscrew hole (8).
    c. Push plug (2) into piston (6).

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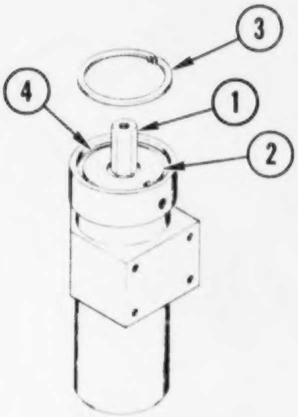
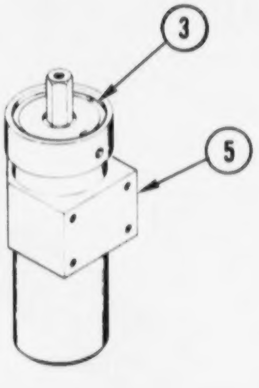


17. SCREW SLIDE HAMMER ADAPTER (1) INTO PLUG (2).

18. PLACE RETAINING RING (3) ON PLUG (2) WITH SHARP EDGE FACING OUT.

19. USING ARBOR PRESS, APPLY PRESSURE TO ADAPTER (1) TO MOVE PLUG (2) BELOW RETAINING RING SLOT (4).



CAUTION

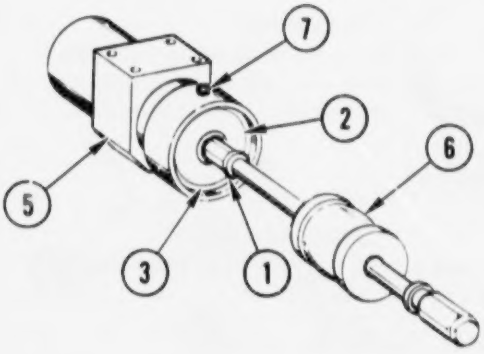
Seat retaining ring firmly in groove. Damage to equipment can occur if ring is not properly seated.

20. INSTALL RETAINING RING (3).
    a. Using retaining-ring pliers, install retaining ring (3) with sharp edge out.
    b. Release pressure and remove assembly (5) from press.

21. SEAT PLUG (2).
    a. Place assembly (5) in vise.
    b. Thread slide hammer (6) into adapter (1).
    c. Pull out plug (2) until it seats against retaining ring (3). Remove adapter (1).
    d. Coat setscrew (7) with sealant compound and install.

22. USING 1/4-INCH DRIVE TORQUE WRENCH AND 3/32-INCH SOCKET WRENCH ATTACHMENT, TORQUE SETSCREW (7) TO 10-15 in-lb (12-17 cmkg).

23. REMOVE ASSEMBLY (5) FROM VISE.



END OF TASK

Section XIX. CROSS SHAFT ASSEMBLY

TASK INDEX

Task	Page	Task	Page
Replace Cross Shaft Assembly	4-458	Repair Cross Shaft Assembly	4-464

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE CROSS SHAFT ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-458). Install (page 4-460).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Socket wrench set — (Item 89, App C)
Spring scale — (Item 91, App C)
Torque wrench — (Item 99, App C)

Materials/Parts:

Cotter pin
Machine bolt

Materials/Parts: (cont)

Machine bolt
Self-locking nut (2)

Personnel Required:

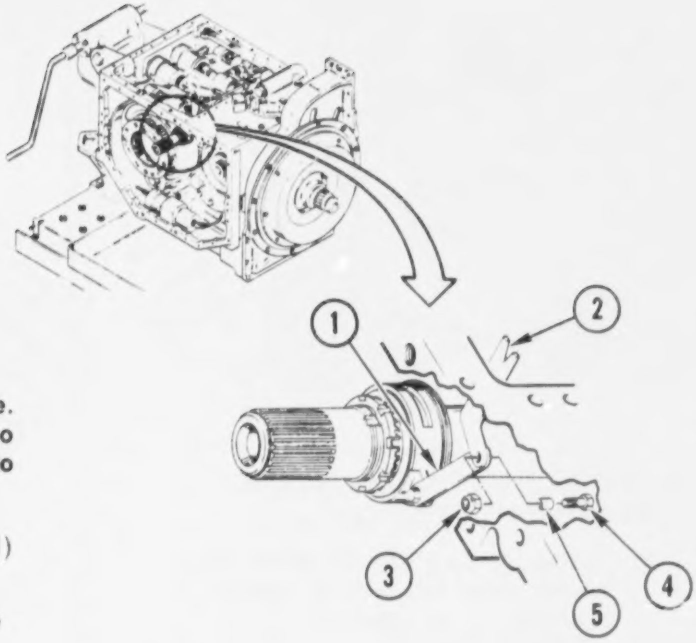
Track Veh Rep 63H10

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
4. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
5. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
6. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
7. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

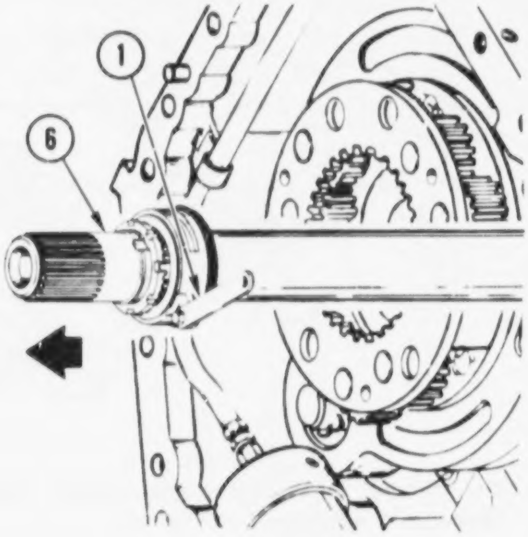


8. TURN TRANSMISSION CONTROLLER SIDE UP.

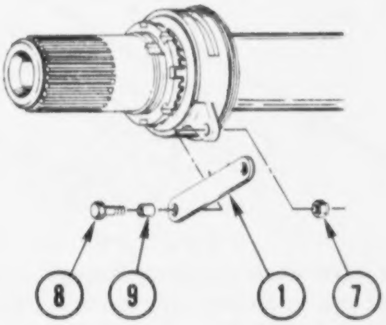
CAUTION

Use care when disconnecting linkage. Attaching parts are small and can fall into transmission during removal. Damage to equipment can occur.

9. DISCONNECT CONNECTING LINK (1) AND SHAFT REVERSE LINK (2).
   a. Using 3/8-inch drive ratchet handle and 3/8-inch socket, remove self-locking nut (3). Discard nut.
   b. Remove bolt (4) and sleeve bushing (5). Separate links (1) and (2). Discard bolt.

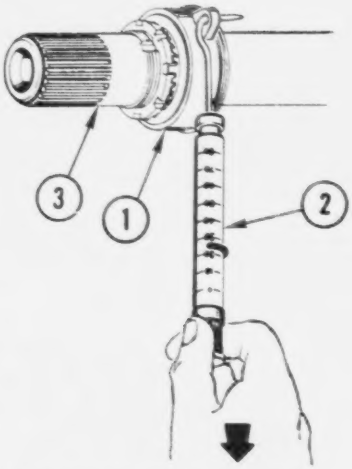


10. REMOVE CROSS SHAFT ASSEMBLY (6).
    a. Remove cross shaft assembly (6) with link (1) and place on work surface.



11. REMOVE LINK (1).
    a. Using 3/8-inch drive ratchet handle and 3/8-inch socket, remove and discard self-locking nut (7).
    b. Remove bolt (8), sleeve bushing (9), and link (1). Discard bolt.

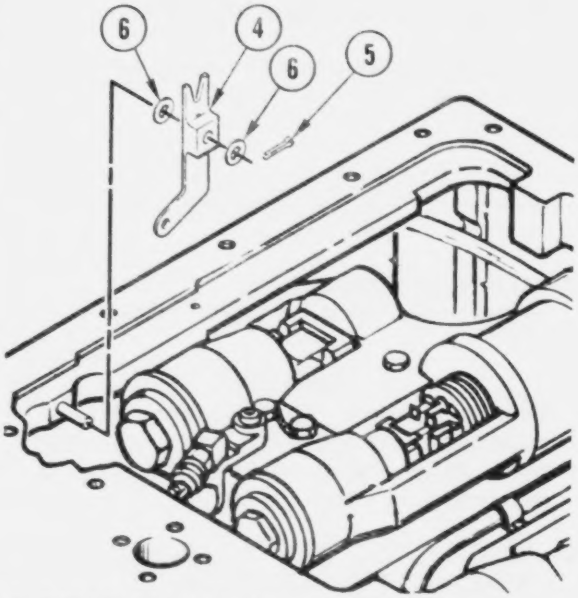
GO TO NEXT PAGE



12. CHECK TENSION ON PRELOAD BEARING HOUSING (1).

    a. Using spring scale (2), measure spring force required to rotate housing (1) on shaft (3).

    b. If force is 16-48 ounces (0.45-1.36 kg), go to step 13. If not, REPAIR CROSS SHAFT ASSEMBLY, page 4-464.

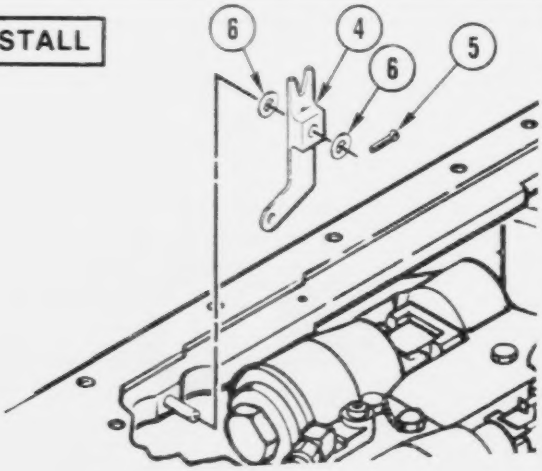


13. REMOVE LINK (4).

    a. Remove and discard cotter pin (5).

    b. Remove washer (6), link (4), and second washer (6).

INSTALL



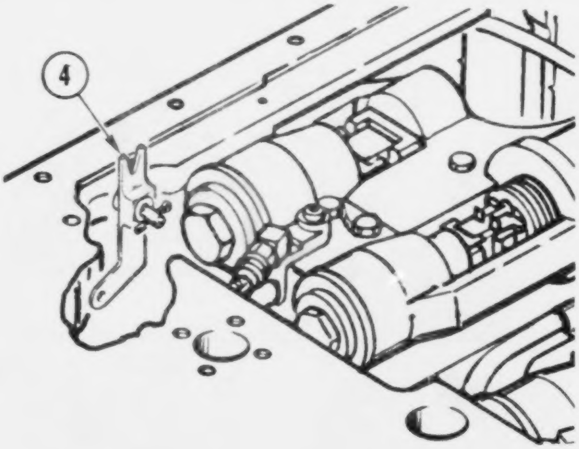
CAUTION

Use care when installing linkage. Attaching parts are small and may fall into transmission during installation. Damage to equipment can occur.

14. INSTALL LINK (4).

    a. Install washer (6), link (4), and second washer (6).

    b. Install new cotter pin (5).



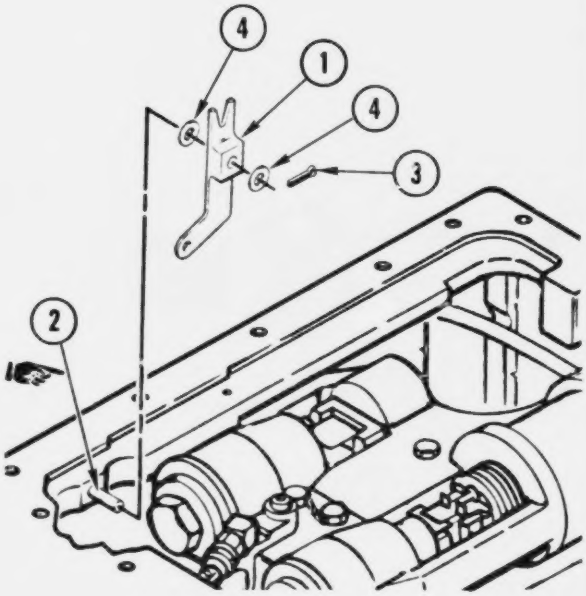
CAUTION

Do not let any hoses rub against link. Damage to equipment can occur.

15. INSPECT LINK (4).

    a. Inspect link (4) for free movement.

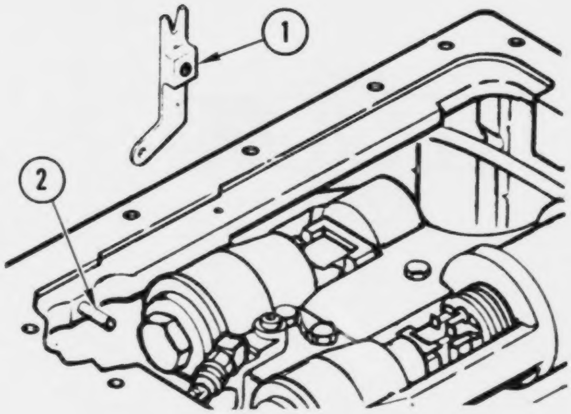
    b. If link (4) does not move freely, go to step 16. If link moves freely, go to step 18.



16. REMOVE LINK (1) FROM PIN (2).

   a. Remove and discard cotter pin (3).

   b. Remove washer (4), link (1), and second washer (4).



17. INSPECT LINK (1) AND PIN (2).

   a. Inspect link (1) and pin (2) for damage. See page 2-5.

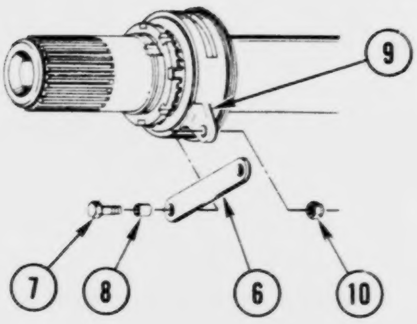
   b. If pin (2) is damaged, go to step 17.1. If not, go to step 17c.

   c. If link (1) is damaged, replace link and go to step 14.

17.1 REPLACE TRANSMISSION. RECORD FAILURE ON DA FORM 2407 AND RETURN REASSEMBLED DEFECTIVE TRANSMISSION TO DEPOT.

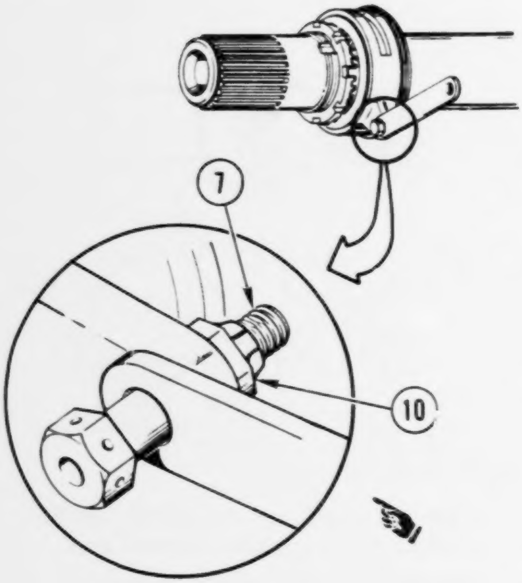
17.2 EFFORT IS COMPLETE. GO TO END OF TASK.

GO TO NEXT PAGE



18. INSTALL LINK (6).
    a. Install longer bolt (7), longer sleeve bushing (8), and link (6) on housing (9).
    b. Install new self-locking nut (10).

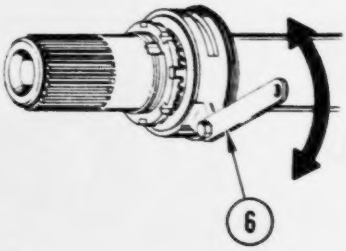
19. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/8-INCH SOCKET, TORQUE NUT (10) TO 45-50 in-lb (52-58 cmkg).



CAUTION

Do not contact nut when distorting threads with wirecutter pliers. Damage to equipment can occur.

19.1 DISTORT THREADS OF BOLT (7).
    a. Using wirecutter pliers close to nut (10), distort two threads on two sides of bolt (7).



20. INSPECT LINK (6).
    a. Inspect link (6) for free movement.
    b. If link (6) does not move freely, go to step 21. If link moves freely, go to step 23.

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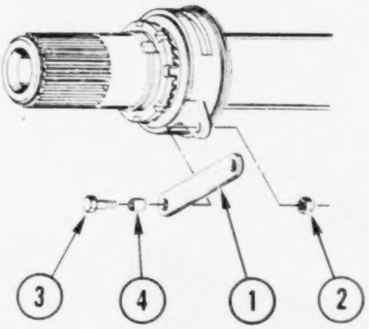
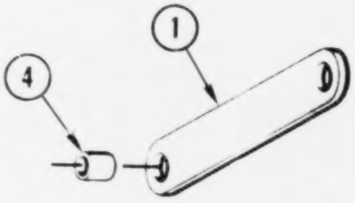
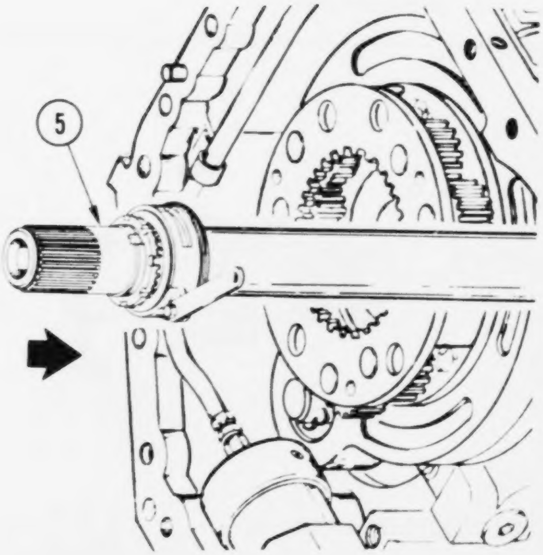


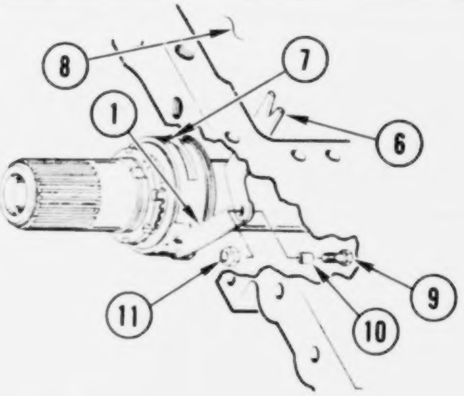
21. REMOVE LINK (1).
    a. Using 3/8-inch drive ratchet handle and 3/8-inch socket, remove and discard self-locking nut (2).
    b. Remove bolt (3), sleeve bushing (4), and link (1). Discard bolt.



22. INSPECT LINK (1), AND SLEEVE BUSHING (4).
    a. Inspect link (1), and sleeve bushing (4) for damage. See page 2-5.
    b. Replace any damaged parts. Go to step 18.



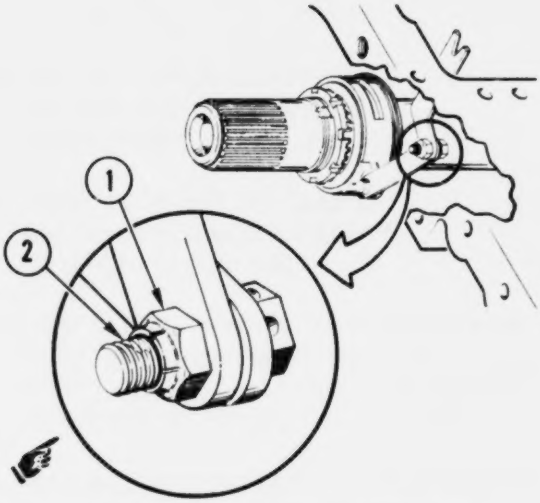
23. INSTALL CROSS SHAFT ASSEMBLY (5).



CAUTION

Slot in cross shaft must face controller opening. If not, damage to equipment can occur.

24. CONNECT LINKS (1) AND (6).
    a. Position slot (7) to face controller opening (8).
    b. Position link (1) inside of link (6). Aline holes and install new bolt (9) and sleeve bushing (10).
    c. Install new self-locking nut (11).



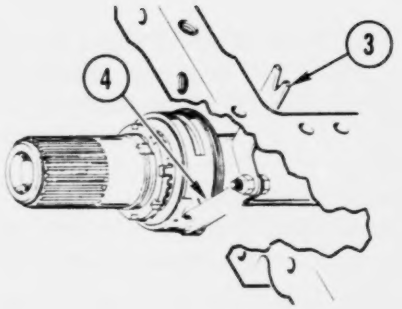
25. USING 3/8-INCH DRIVE TORQUE WRENCH AND 3/8-INCH SOCKET, TORQUE NUT (1) TO 45-50 in-lb (52-58 cmkg).

CAUTION

Do not contact nut when distorting threads with wirecutter pliers. Damage to equipment can occur.

25.1 DISTORT THREADS OF BOLT (2).

a. Using wirecutter pliers close to nut (1), distort two threads on two sides of bolt (2).



26. INSPECT LINKS (3) AND (4).

a. Inspect links (3) and (4) for free movement.

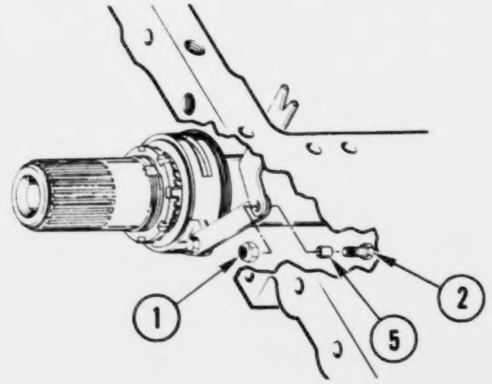
b. If links (3) and (4) do not move freely, go to step 27. If links do move freely, go to step 28.

27. INSPECT BOLT (2), SLEEVE BUSHING (5), AND NUT (1).

a. Remove bolt (2), sleeve bushing (5), and nut (1). Discard bolt and nut.

b. Inspect sleeve bushing (5) for damage. See page 2-5.

c. Replace sleeve bushing if damaged. Go to step 24.



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28. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.

29. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.

30. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.

31. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

32. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

33. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.

34. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR CROSS SHAFT ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-464). Assemble (page 4-467).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing nut wrench — (Item 15, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Machinist's vise — (Item 47, App C)
Mechanical puller kit — (Item 49, App C)
Micrometer caliper set — (Item 52, App C)
Spring scale — (Item 91, App C)
Telescoping gage set — (Item 93, App C)

Materials/Parts:

Sealant compound—(Item 11, App B)
Wiping rag—(Item 13, App B)

Materials/Parts: (cont)

Wood block (2) — (Item 3, App D)
Spring washer (2)

Personnel Required:

Track Veh Rep 63H10

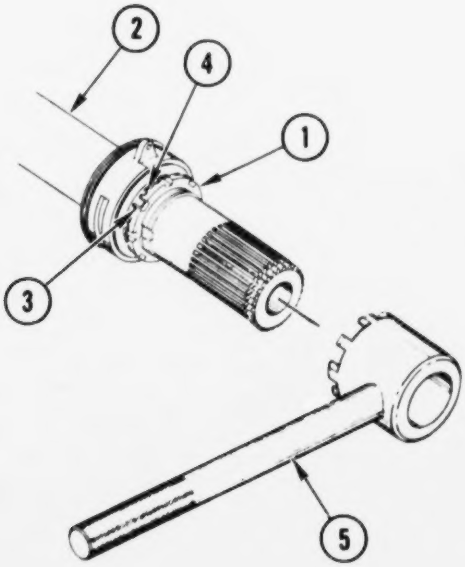
References:

TM 9-214

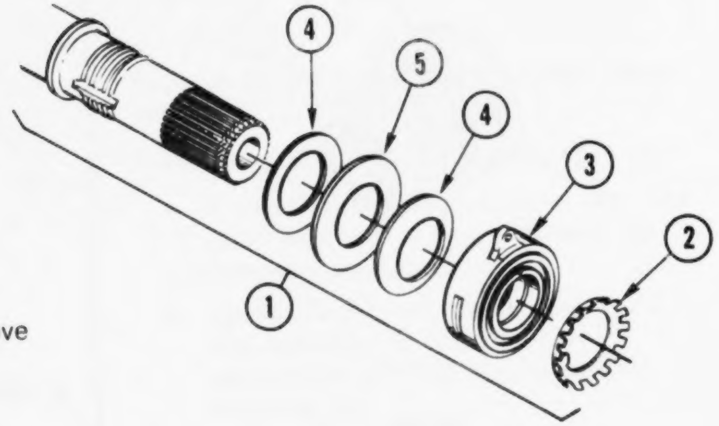
Equipment Conditions:

Cross shaft assembly on workbench. See page 4-458.

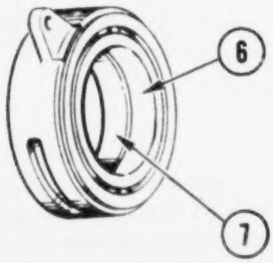
DISASSEMBLE



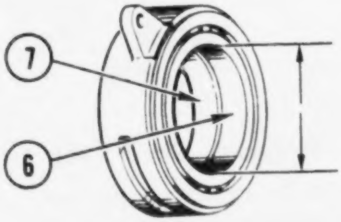
1. REMOVE ROUND PLAIN RETAINING NUT (1).
   a. Secure cross shaft assembly (2) in vise.
   b. Straighten bent tang (3) on key washer (4).
   c. Using bearing nut wrench (5), remove nut (1).



2. DISASSEMBLE CROSS SHAFT ASSEMBLY (1).
   a. Remove key washer (2).
   b. Using mechanical puller kit, remove bearing unit housing (3).
   c. Remove spring washer (4), ring spacer (5), and second spring washer (4).
   d. Discard two spring washers (4).



3. INSPECT BALL BEARINGS (6) AND (7).
   a. Inspect bearings (6) and (7) for damage. See TM 9-214.
   b. If bearings (6) and (7) are not damaged, go to step 4.
   c. If either bearing (6) or (7) is damaged, go to step 5.



4. CHECK BEARINGS (6) AND (7).
   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bearings (6) and (7).
   b. If either measurement is greater than 2.1659 inches (55.014 mm), go to step 5.
   c. If measurement is 2.1659 inches (55.014 mm), or less, go to step 7.

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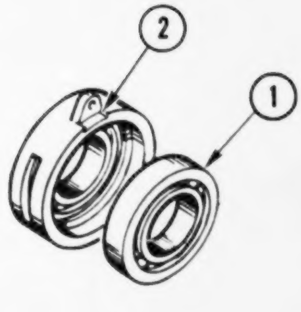
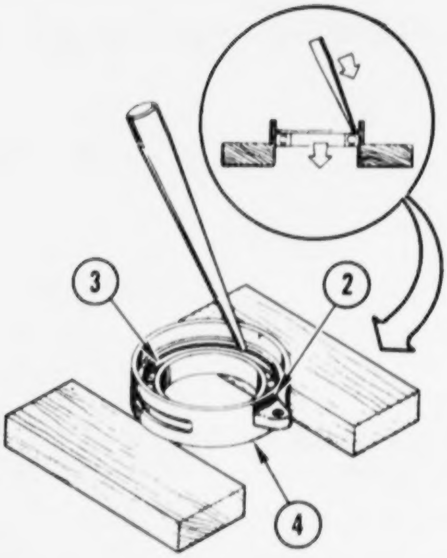


NOTE

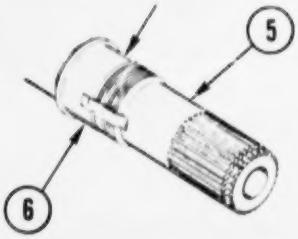
Bearing on same side of cast depression is normally loose and must be removed first.

5. REMOVE AND DISCARD BEARING (1) ON SAME SIDE AS CAST DEPRESSION (2).

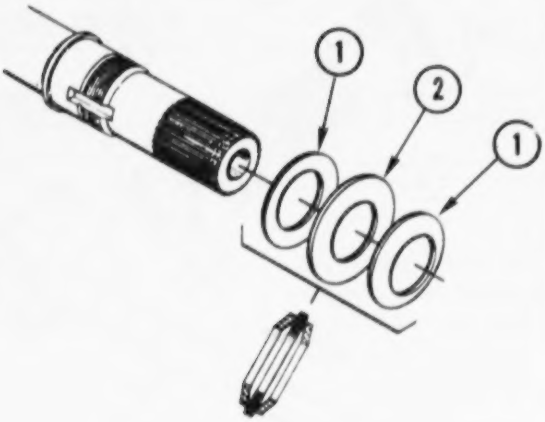


6. REMOVE AND DISCARD BEARING (3).
   a. Place housing (4) on two wood blocks with cast depression (2) up. Do not place blocks in way of bearing (3).
   b. Using drive punch and hammer, remove and discard bearing (3).

7. CHECK STRAIGHT SHAFT (5).
   a. Using micrometer caliper set, measure outside diameter of bearing surface (6).
   b. Replace straight shaft (5) if measurement is less than 2.1637 inches (54.958 mm).
8. CLEAN CROSS SHAFT ASSEMBLY.
   a. Clean straight shaft and piece parts. See page 2-2.
9. INSPECT CROSS SHAFT ASSEMBLY.
   a. Inspect straight shaft and piece parts. See page 2-5.



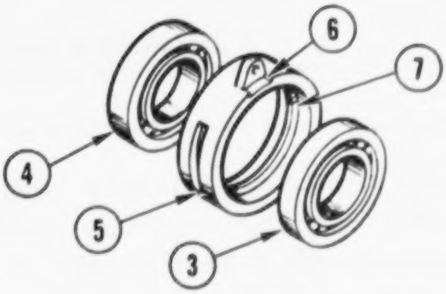
ASSEMBLE



NOTE

Spring washers must be installed with cupped face toward spacer.

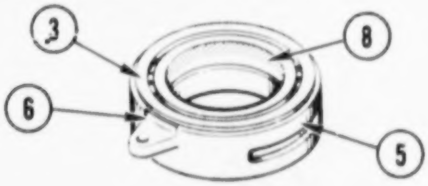
10. INSTALL NEW SPRING WASHER (1), RING SPACER (2), AND SECOND NEW SPRING WASHER (1).



NOTE

Bearings are the same and will fit either side of housing.

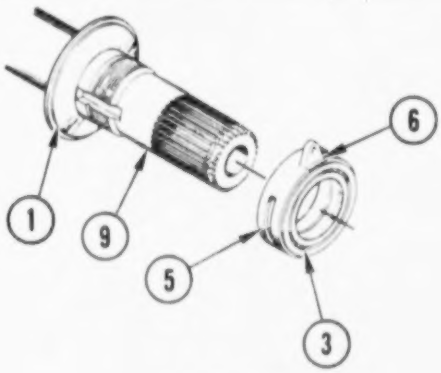
11. INSTALL NEW BEARINGS (3) AND (4).
    a. If bearings (3) and (4) were removed, go to step 11b. If bearings were not removed, go to step 12.
    b. Using arbor press, press bearing (4) into housing (5) opposite cast depression (6) until seated against shoulder (7).
    c. Turn housing (5) over.
    d. Push bearing (3) into housing (5) until seated against shoulder (7).



NOTE

Sealant compound will harden in approximately 15 minutes at room temperature. Steps 12 through 18 must be completed before compound sets up. If compound hardens before parts are assembled, parts will have to be disassembled and cleaned and assembly repeated.

12. APPLY SEALANT COMPOUND TO INNER RACE (8) OF BEARING (3).
    a. Apply a light coating of sealant compound to outer half of inner race (8) of bearing (3). Bearing is on same side of housing (5) as cast depression (6).
    b. Using wiping rag, wipe off excess sealant compound.



CAUTION

Do not install housing with cast depression facing spring washers or equipment damage will result.

13. INSTALL HOUSING (5).
    a. Install housing (5) with bearing (3) and cast depression (6) facing away from spring washer (1).
    b. Using wiping rag, wipe off any sealant compound on straight shaft (9).

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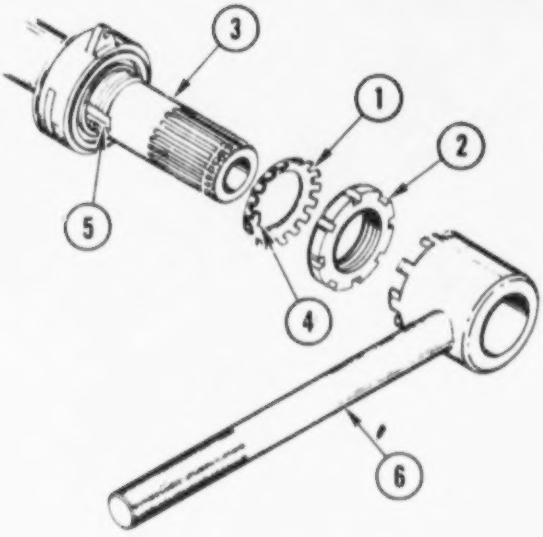
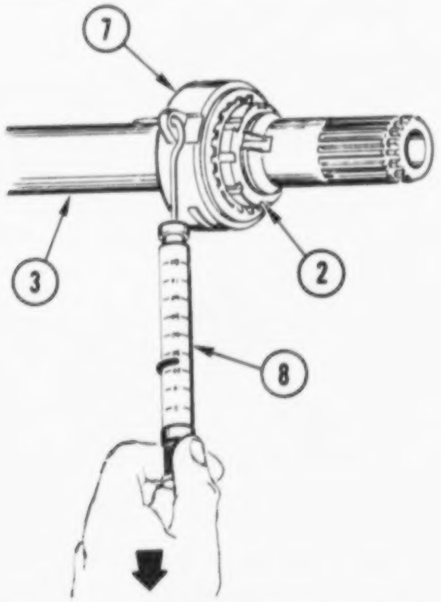


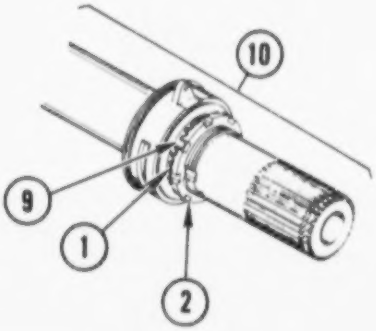
14. INSTALL KEY WASHER (1) AND NUT (2).
    a. Secure straight shaft (3) in vise.
    b. Aline inner key (4) of key washer (1) with groove (5) on straight shaft (3). Install key washer (1) with tangs facing nut (2).
    c. Install nut (2) with bevel side facing in. Hand tighten.

15. USING BEARING NUT WRENCH (6), TIGHTEN NUT (2) 2 1/4 TURNS, THEN BACK OFF 1/4 TURN.



16. ADJUST TENSION ON HOUSING (7).
    a. Using spring scale (8), measure spring force required to rotate housing (7) on straight shaft (3).

17. TIGHTEN NUT (2) UNTIL SPRING FORCE REQUIRED TO ROTATE HOUSING (7) ON STRAIGHT SHAFT (3) IS 16-48 OUNCES (0.45-1.36 kg).



18. SECURE NUT (2).
    a. Bend one tang (9) of key washer (1) into slot on nut (2).
    b. Remove cross shaft assembly (10) from vise.

END OF TASK

Section XX. TOW PUMP ASSEMBLY

TASK INDEX

Task	Page	Task	Page
Replace Tow Pump Assembly	4-470	Repair Tow Pump Assembly	4-474

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv .

REPLACE TOW PUMP ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-470). Install (page 4-472).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Torque wrench —
(Item 100, App C)

Materials/Parts:

Cleaning solvent—(Item 1, App B)
Transmission oil—(Item 12, App B)

Materials/Parts: (cont)

Wiping rag—(Item 13, App B)
Transmission repair kit

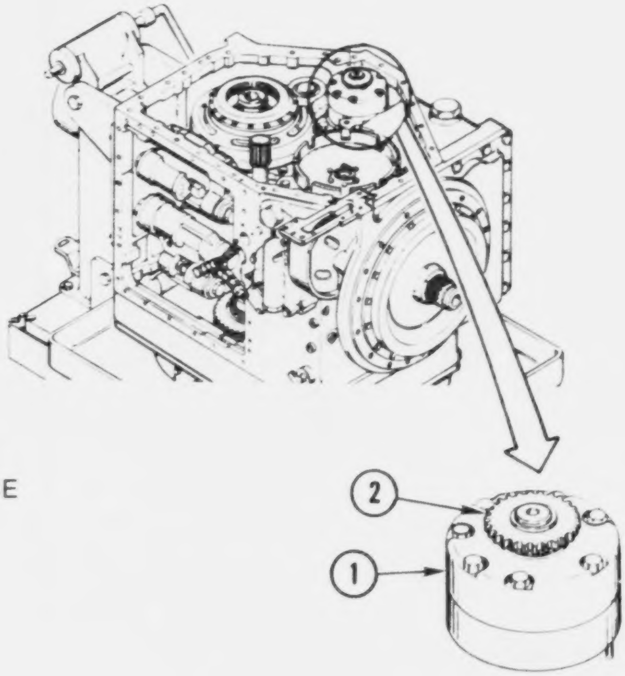
Personnel Required:

Track Veh Rep 63H10

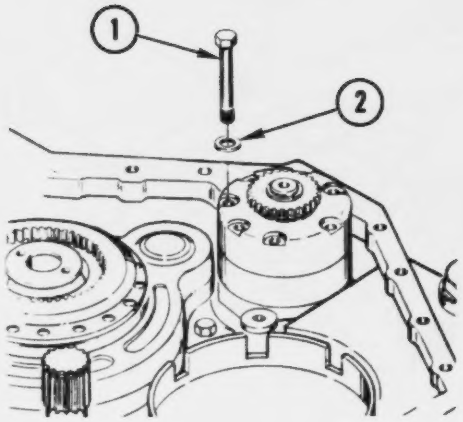
Equipment Conditions:

Transmission mounted on tip-over stand.
See page 2-144.

REMOVE

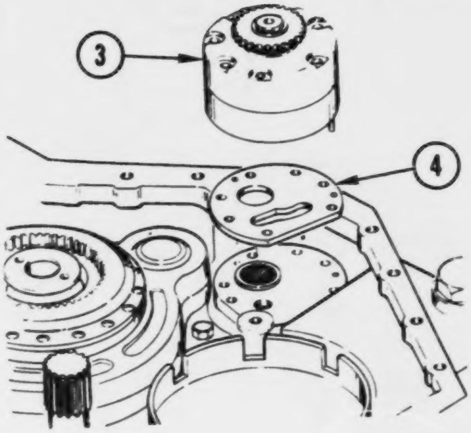


1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
3. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
4. INSPECT TOW PUMP ASSEMBLY (1) FOR BINDING.
   a. Rotate spur gear (2) in both directions.
   b. Note if gear (2) turns easily.



5. REMOVE SEVEN SCREWS (1).

   a. Remove seven screws (1) and washers (2).

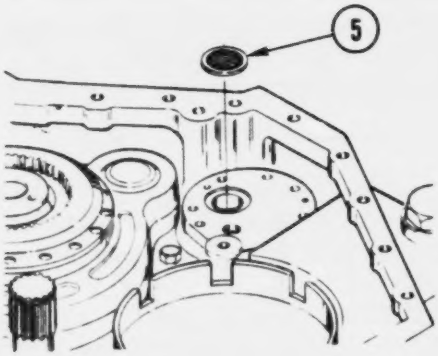


CAUTION

To prevent loss of parts, do not let tow pump halves come apart. Damage to equipment can occur.

6. REMOVE TOW PUMP ASSEMBLY (3).

   a. Remove tow pump (3), and gasket (4). Discard gasket.



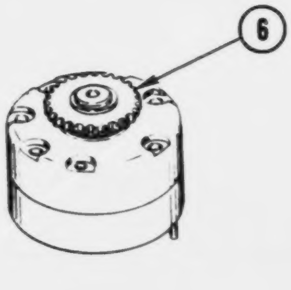
7. REMOVE SCREEN (5).

8. INSPECT SCREEN (5) FOR DAMAGE.

   a. Inspect screen (5) for breaks and wear. Replace if damaged.

9. INSPECT MAIN HOUSING INSERTS. See page 2-5.

   a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

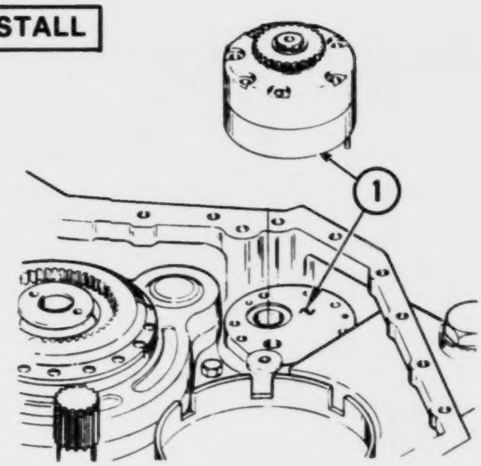


10. IF GEAR (6) DID NOT TURN EASILY, GO TO STEP 11. IF GEAR DID TURN EASILY, GO TO STEP 12.

11. REPAIR TOW PUMP ASSEMBLY, page 4-474.

GO TO NEXT PAGE

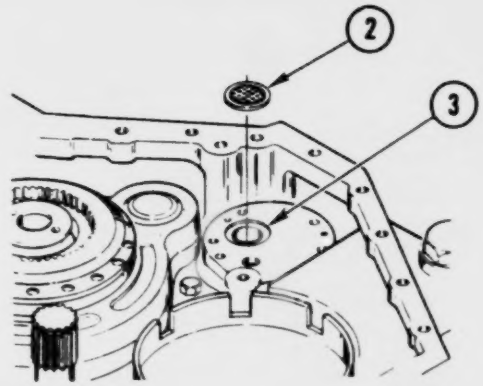
INSTALL



WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

12. CLEAN MATING SURFACES (1).
    a. Use wiping rag dampened with cleaning solvent.



CAUTION

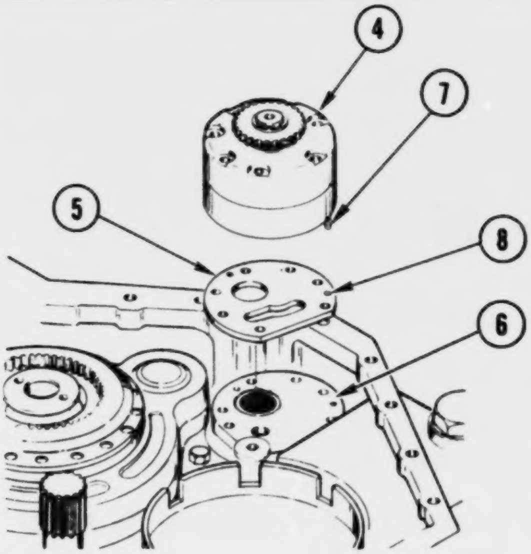
Screen must be flush with housing. Damage to equipment can occur.

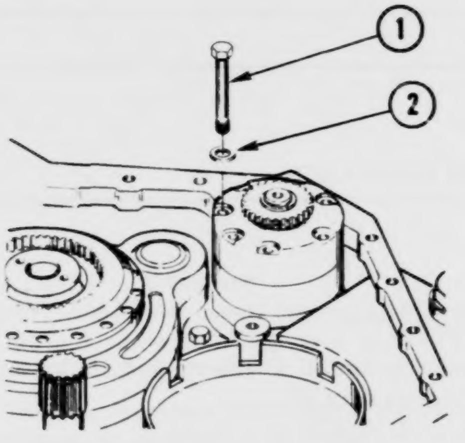
13. INSTALL SCREEN (2).
    a. Seat screen (2) fully in tow pump mounting pad recess (3).

CAUTION

To prevent loss of parts, do not let tow pump halves come apart. Damage to equipment can occur.

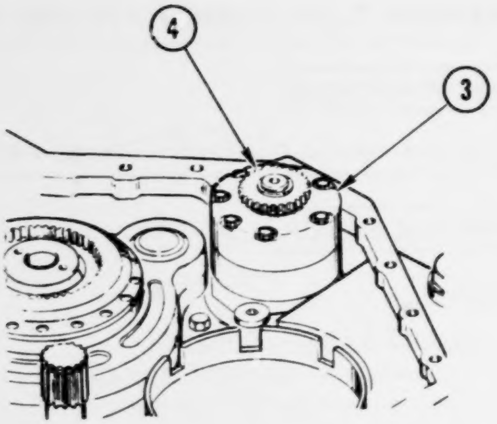
14. POSITION TOW PUMP (4).
    a. Coat new gasket (5) with transmission oil and position on mounting pad (6).
    b. Aline pins (7) with mating holes (8). Place tow pump (4) on gasket (5).





15. INSTALL SEVEN SCREWS (1).
    a. Install seven washers (2) and screws (1).

16. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE SEVEN SCREWS (1) TO 10-12 ft-lb (1-2 mkg).



17. INSPECT TOW PUMP ASSEMBLY (3) FOR BINDING.
    a. Rotate gear (4) in both directions.
    b. If gear (4) turns easily, go to step 18. If not, go to step 5.

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18. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

19. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

20. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR TOW PUMP ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-474). Assemble (page 4-478).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)
Inserted hammer face holder —
(Item 39A, App C)
Inserted hammer face — (Item 39B, App C)
Inserted hammer face — (Item 39C, App C)
Mechanical puller — (Item 48, App C)
Micrometer caliper set —
(Item 52, App C)
Micrometer depth gage —
(Item 54, App C)
Telescoping gage set — (Item 93, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Retaining ring (3)
Woodruff key (2)

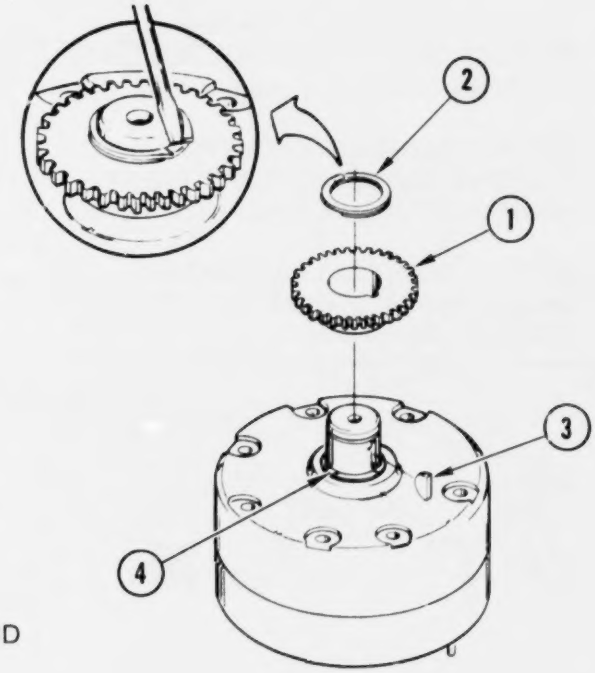
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Tow pump assembly on workbench.
See page 4-470.

DISASSEMBLE



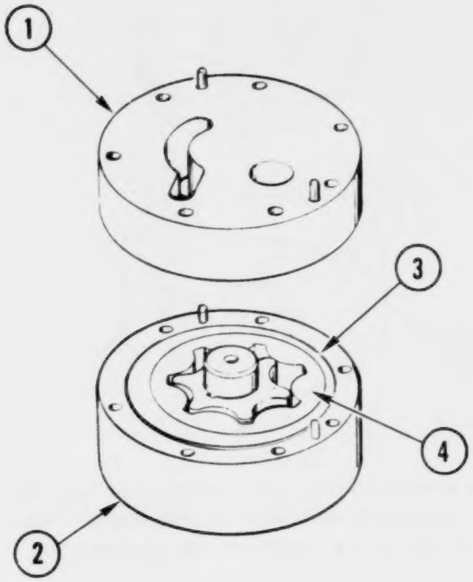
1. REMOVE SPUR GEAR (1).
   a. Using screwdriver, remove retaining ring (2). Discard retaining ring.
   b. Using mechanical puller, pull off gear (1).
2. REMOVE AND DISCARD WOODRUFF KEY (3).
3. USING SCREWDRIVER, REMOVE SECOND RETAINING RING (4). DISCARD RETAINING RING.

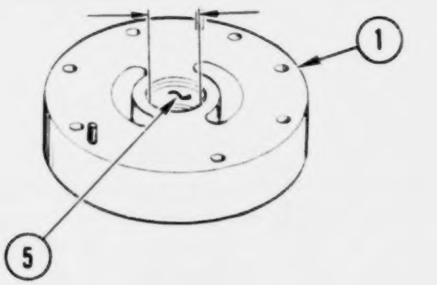
CAUTION

Eccentric ring, outer rotor, spring, and vane may fall out when removing plate assembly. Equipment damage can result.

Inner and outer rotors must stay a matched set. Damage to equipment can occur.

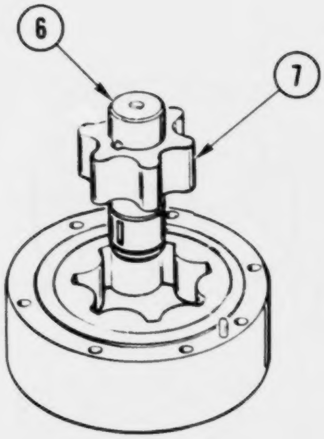
4. REMOVE PUMP PLATE ASSEMBLY (1).
   a. Turn liquid pump housing (2) over.
   b. Carefully break loose oil suction between plate assembly (1) and housing (2).
   c. Hold eccentric ring (3) and outer rotor (4) in place while removing plate assembly (1).





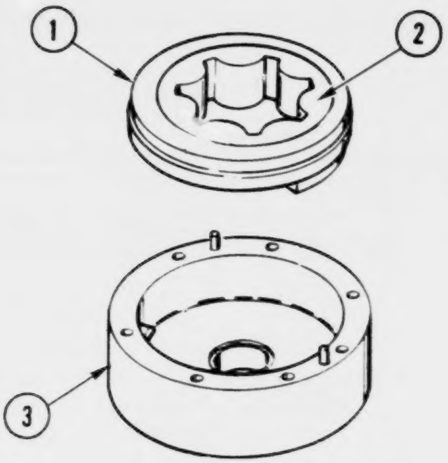
5. CHECK PLATE ASSEMBLY (1).
   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of sleeve bushing (5).
   b. If diameter of sleeve bushing (5) is greater than 1.002 inches (25.45 mm), go to step 5.1. If not, go to step 6.

5.1 REPLACE PLATE ASSEMBLY (1). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE PLATE ASSEMBLY TO DEPOT.



6. REMOVE SHOULDERED SHAFT (6) AND INNER ROTOR (7).

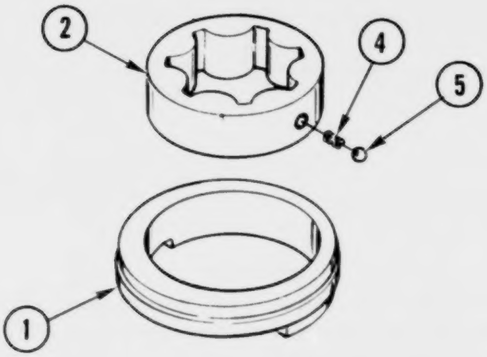
GO TO NEXT PAGE



CAUTION

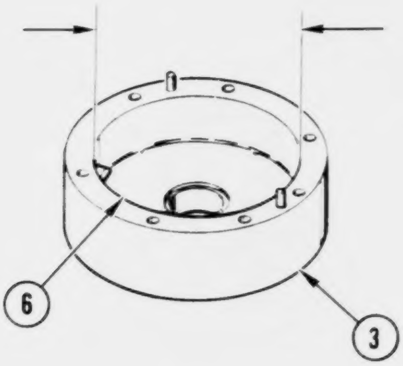
Keep eccentric ring and outer rotor together when removing from housing. Spring and vane can be lost and equipment can be damaged.

7. PULL OUT RING (1) AND OUTER ROTOR (2) FROM LIQUID PUMP HOUSING (3) AS ONE UNIT.

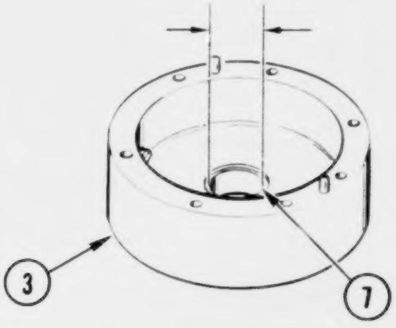


8. IF OUTER ROTOR (2) AND RING (1) HAVE COME APART, GO TO STEP 9. IF NOT, GO TO STEP 10.

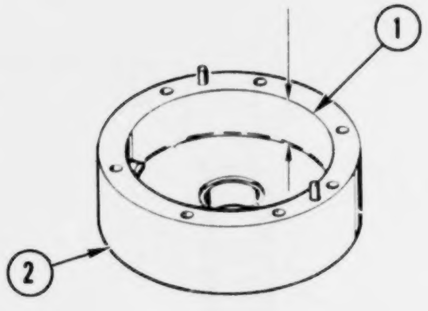
9. ASSEMBLE OUTER ROTOR (2) AND RING (1).
   a. Install spring (4) and vane (5) into rotor (2).
   b. While holding spring (4) and vane (5) with thumb, insert rotor (2) into ring (1).



10. CHECK INSIDE DIAMETER OF PUMP HOUSING CAVITY (6).
    a. Using telescoping gage set and micrometer caliper set, measure diameter of cavity (6).
    b. If measurement is greater than 3.8775 inches (98.489 mm), go to step 12.1. If not, go to step 11.



11. CHECK INSIDE DIAMETER OF SLEEVE BEARING (7).
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of bearing (7).
    b. If measurement is greater than 1.002 inches (25.45 mm), go to step 12.1. If not, go to step 12.

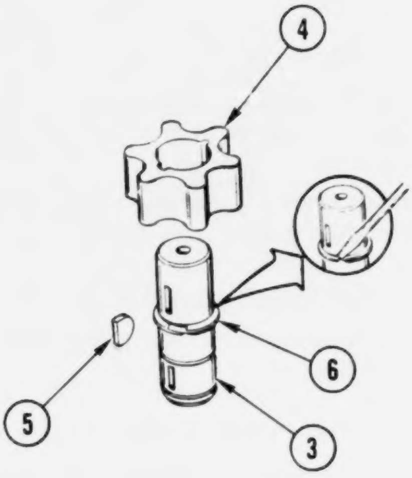


12. CHECK DEPTH OF PUMP HOUSING CAVITY (1).

a. Using depth gage measure depth of cavity (1).

b. If measurement is greater than 1.003 inches (25.46 mm), go to step 12.1. If not, go to step 13.

12.1 REPLACE HOUSING (2). RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE HOUSING TO DEPOT.



13. DISASSEMBLE SHAFT (3).

a. Remove inner rotor (4).

b. Remove and discard woodruff key (5).

c. Using screwdriver, remove retaining ring (6). Discard retaining ring.

CAUTION

Keep eccentric ring and outer rotor together when measuring thickness to prevent loss of spring and vane.

Inner and outer rotors must stay a matched set. Damage to equipment can occur.

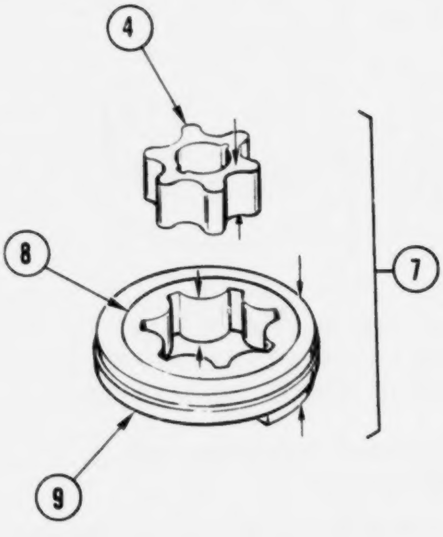
14. CHECK GEAR ROTOR SET (7).

a. Using micrometer caliper set, measure thickness of inner rotor (4) and outer rotor (8).

b. Replace gear rotor set (7) if either measurement is less than 0.998 inch (25.35 mm) and go to step 15.

c. Using micrometer caliper set, measure thickness of ring (9).

d. Replace gear rotor set (7) if measurement is less than 0.985 inch (25.02 mm).



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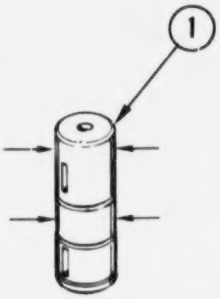
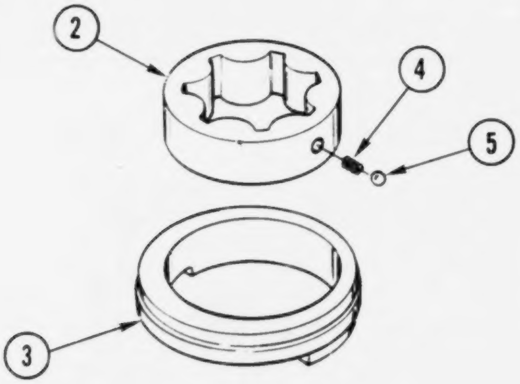


15. CHECK SHAFT (1).
    a. Using micrometer caliper set, measure diameter of shaft (1) in two places.
    b. Replace shaft (1) if either measurement is less than 0.9993 inch (25.382 mm).

16. CLEAN TOW PUMP ASSEMBLY.
    a. Clean housing and piece parts. See page 2-2.

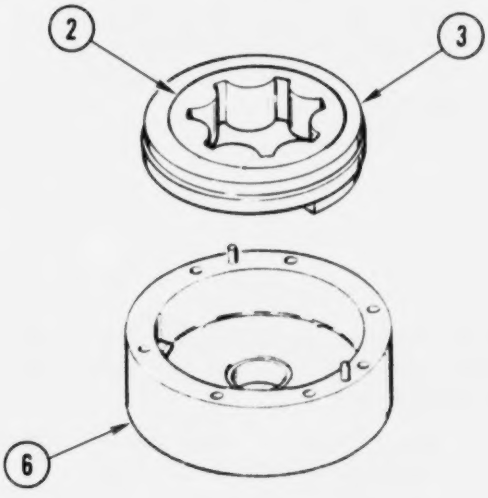
17. INSPECT TOW PUMP ASSEMBLY.
    a. Inspect housing and piece parts. See page 2-5.

ASSEMBLE



18. IF OUTER ROTOR (2) AND RING (3) HAVE COME APART, GO TO STEP 19. IF NOT, GO TO STEP 20.

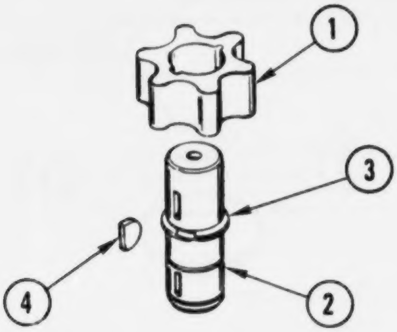
19. ASSEMBLE OUTER ROTOR (2) AND RING (3).
    a. Install spring (4) and vane (5) into rotor (2).
    b. While holding spring (4) and vane (5) with thumb, insert rotor (2) into ring (3).



CAUTION

Keep eccentric ring and outer rotor together when installing to prevent loss of spring and vane.

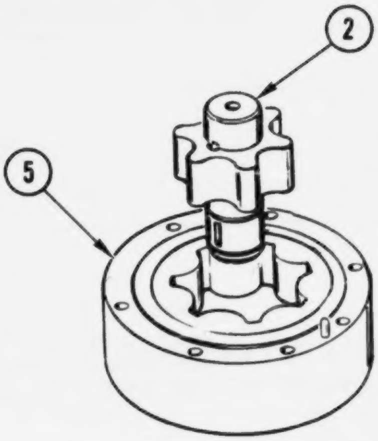
20. INSERT RING (3) AND OUTER ROTOR (2) INTO HOUSING (6).
    a. Coat ring (3) and rotor (2) with transmission oil.
    b. Install ring (3) and rotor (2) in housing (6).



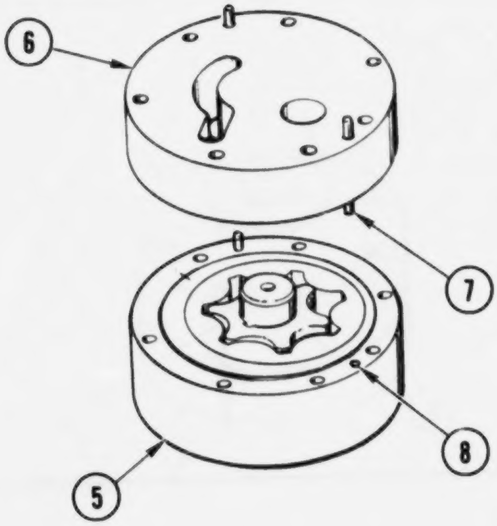
CAUTION

Inner and outer rotors must stay a matched set. Damage to equipment can occur.

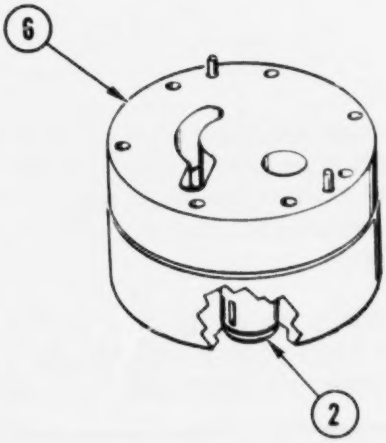
21. INSTALL INNER ROTOR (1) ON SHAFT (2).
    a. Install new retaining ring (3).
    b. Install new woodruff key (4).
    c. Slide rotor (1) onto shaft (2).



22. INSTALL SHAFT (2) IN HOUSING (5).
    a. Coat shaft (2) with transmission oil.
    b. Install shaft (2) in housing (5).



23. INSTALL PLATE ASSEMBLY (6) ON HOUSING (5).
    a. Aline pin (7) on plate assembly (6) with pilot hole (8) on housing (5).
    b. Install plate assembly (6) on housing (5).



24. ROTATE SHAFT (2) IN BOTH DIRECTIONS TO VERIFY FREE MOVEMENT.
    a. If shaft (2) rotates freely, go to step 25. If not, go to step 4.

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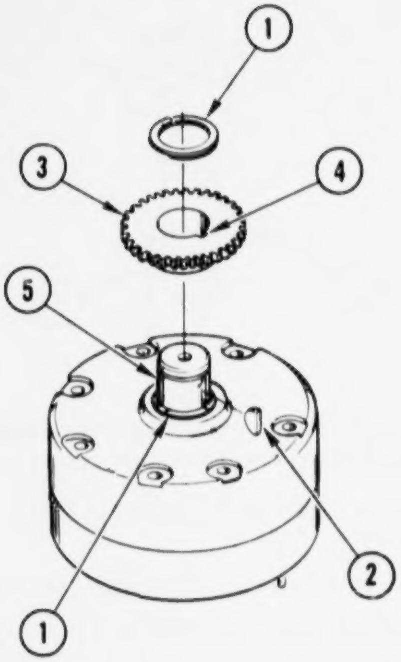
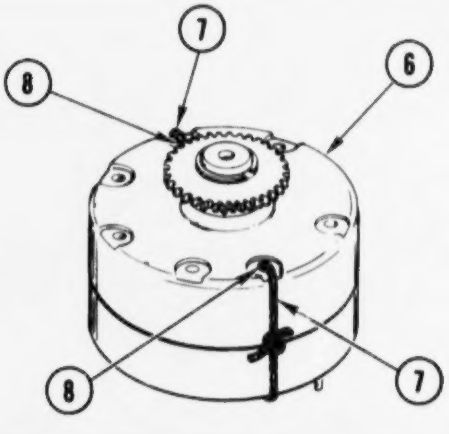


25. INSTALL NEW RETAINING RING (1), NEW WOODRUFF KEY (2), AND SPUR GEAR (3).
    - a. Install new retaining ring (1).
    - b. Install new woodruff key (2).
    - c. Aline key way (4) on gear (3) with woodruff key (2).
    - d. Using plastic-faced hammer, tap gear (3) onto shaft (5).

26. INSTALL NEW SECOND RETAINING RING (1).



27. IF TOW PUMP ASSEMBLY (6) IS TO BE STORED FOR LATER USE, GO TO STEP 28. IF TOW PUMP ASSEMBLY IS TO BE INSTALLED, GO TO END OF TASK.

28. PLACE STRING OR WIRE (7) THROUGH TWO SCREW HOLES (8) TO HOLD PARTS TOGETHER.

END OF TASK

Section XXI. AUXILIARY MAKEUP PUMP

TASK INDEX

Task	Page	Task	Page
Replace Auxiliary Makeup Pump	4-482	Repair Auxiliary Makeup Pump	4-497

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE AUXILIARY MAKEUP PUMP

DESCRIPTION

This task covers: Remove (page 4-482). Install (page 4-490).

INITIAL SETUP

Tools:

Arbor press — (Item 3, App C)
Bearing installer — (Item 11, App C)
Crowfoot attachment — (Item 20, App C)
Drag wrench — (Item 24, App C)
General mechanic's tool kit:
automotive — (Item 33, App C)
Micrometer caliper set —
(Item 52, App C)
Slip-joint pliers — (Item 70, App C)
Socket wrench set — (Item 88, App C)
Socket wrench set — (Item 89, App C)
Telescoping gage set — (Item 93, App C)
Torque wrench — (Item 98, App C)
Torque wrench — (Item 99, App C)
Torque wrench — (Item 100, App C)

Materials/Parts:

Cleaning solvent — (Item 1, App B)
Sealant compound — (Item 11, App B)
Transmission oil — (Item 12, App B)

Materials/Parts: (cont)

Wiping rag — (Item 13, App B)
Gasket
Gasket
Lock washer (17)
Preformed packing
Preformed packing
Preformed packing
Preformed packing
Retaining ring (2)
Retaining ring (2)
Woodruff key

Personnel Required:

Track Veh Rep 63H10

References:

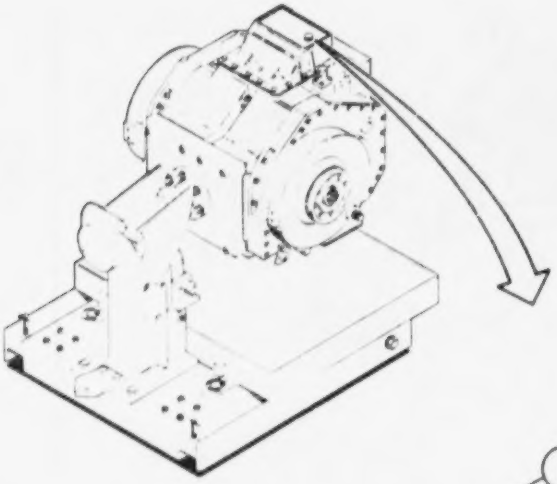
TM 9-214

Equipment Conditions:

Transmission mounted on tip-over stand. See page 2-144.

REMOVE

1. REMOVE DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.
2. REMOVE DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.
3. REMOVE POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.



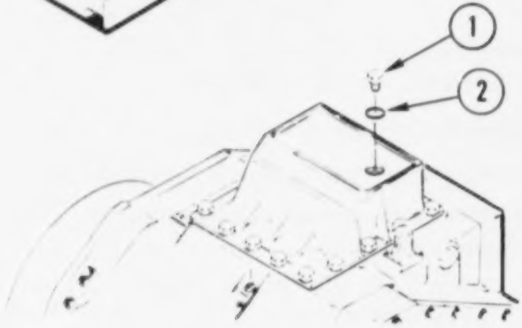
4. POSITION TRANSMISSION BOTTOM SIDE UP.

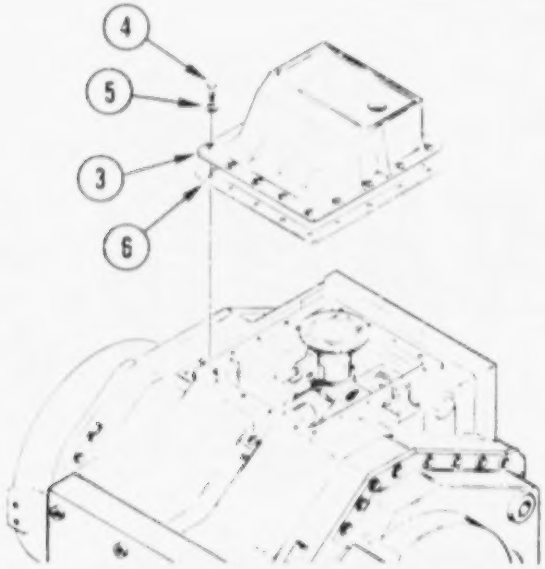
5. REMOVE PLUG (1).
   a. Remove plug (1).
   b. Remove gasket (2) from plug (1). Discard gasket.

WARNING

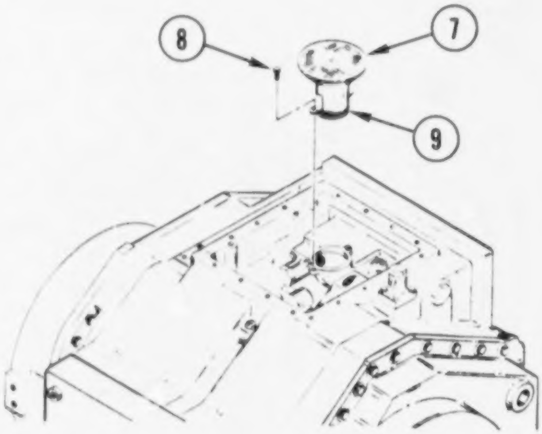
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

6. CLEAN PLUG (1).
   a. Use wiping rag dampened with cleaning solvent.



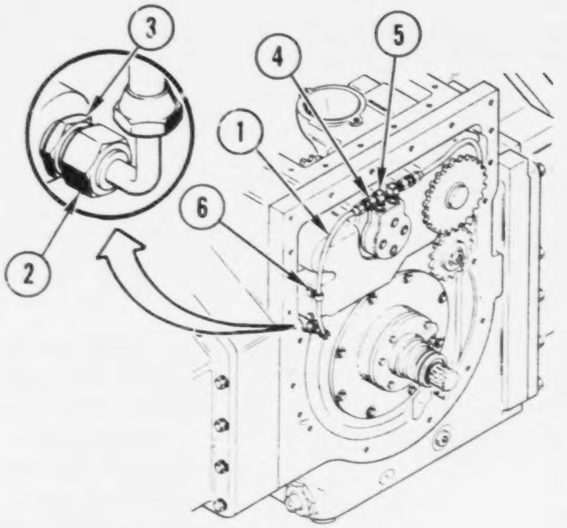


7. REMOVE SUMP COVER (3).
   a. Remove 17 bolts (4) and lock washers (5). Discard lock washers.
   b. Remove cover (3) and gasket (6). Discard gasket.

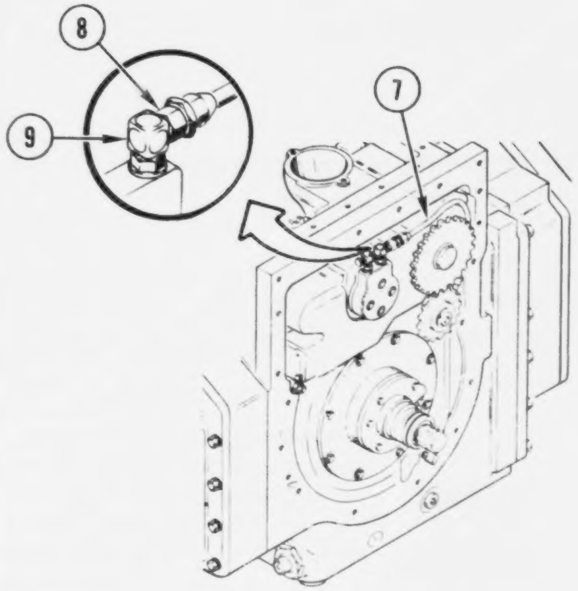


8. REMOVE AUXILIARY MAKEUP SCREEN (7).
   a. Using 3/8-inch ratchet handle with 7/16-inch socket, remove two screws (8).
   b. Pull screen (7) off.
   c. Remove preformed packing (9) from screen (7). Discard packing.

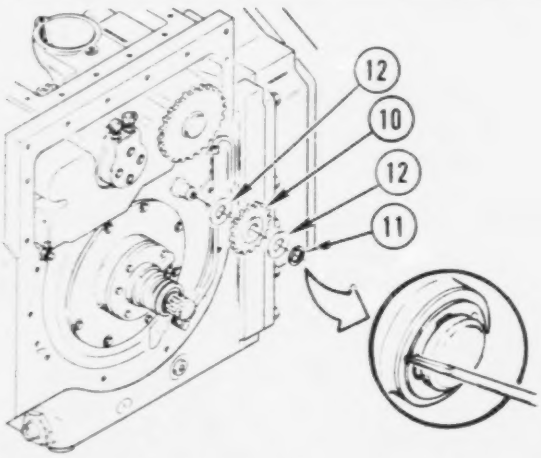
GO TO NEXT PAGE



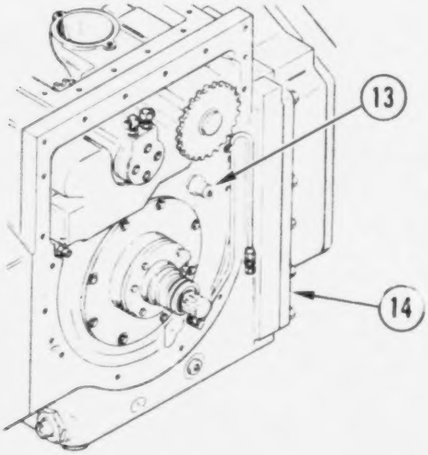
9. REMOVE HOSE ASSEMBLY (1).
   a. Disconnect nut (2) from adapter (3).
   b. Disconnect nut (4) from hose to boss elbow (5).
   c. Remove screw (6) and hose assembly (1).



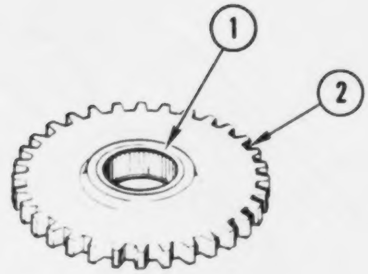
10. DISCONNECT HOSE ASSEMBLY (7).
    a. Disconnect nut (8) from hose to boss elbow (9).



11. REMOVE SPUR GEAR (10).
    a. Using screwdriver, remove two-piece retaining ring (11). Discard retaining ring.
    b. Remove thrust washer bearing (12).
    c. Remove gear (10).
    d. Remove second thrust washer bearing (12).



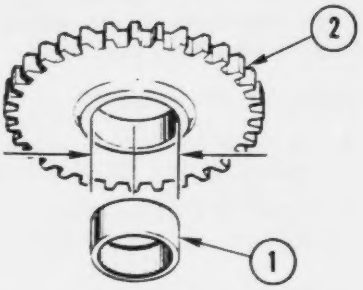
12. INSPECT AUXILIARY PUMP SHOULDERED SHAFT (13).
    a. Inspect shaft (13) for damage. See page 2-5.
    b. If shaft (13) is damaged, go to step 19.1. If not, go to step 13.



13. INSPECT ROLLER BEARING (1) IN GEAR (2).

    a. Inspect bearing (1) for damage. See TM 9-214.

    b. If bearing (1) is damaged, go to step 14 If not, go to step 16.

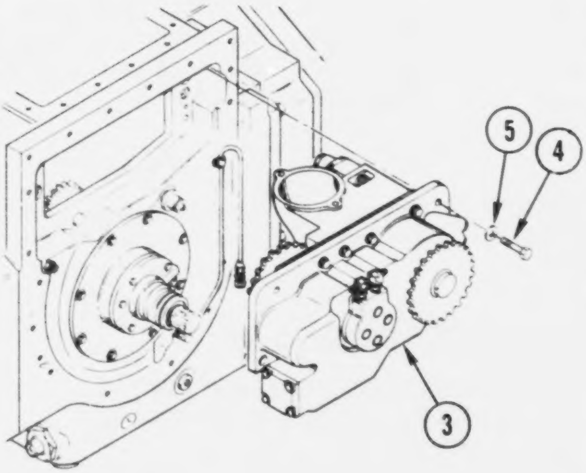


14. REMOVE BEARING (1).

    a. Using arbor press and bearing installer, press out and discard bearing (1).

15. CHECK GEAR (2).

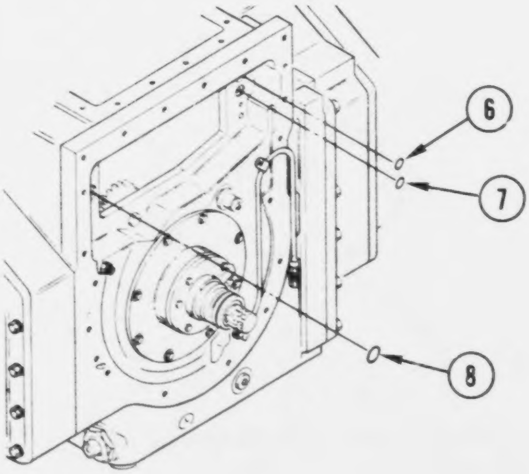
    a. Using telescoping gage set and micrometer caliper set, measure inside diameter of gear (2). Replace gear if measurement is greater than 1.001 inches (25.43 mm).



16. REMOVE AUXILIARY MAKEUP PUMP (3).

    a. Remove four screws (4) and washers (5).

    b. Remove pump (3).



17. REMOVE AND DISCARD THREE PREFORMED PACKINGS (6), (7), AND (8).

GO TO NEXT PAGE

CAUTION

Use care when removing retaining ring. Pieces may fall into transmission during removal. Damage to equipment can occur.

18. REMOVE SPUR GEAR (1).

   a. Using screwdriver, remove two-piece retaining ring (2). Discard ring.

   b. Remove thrust washer bearing (3), gear (1), and second bearing (3).

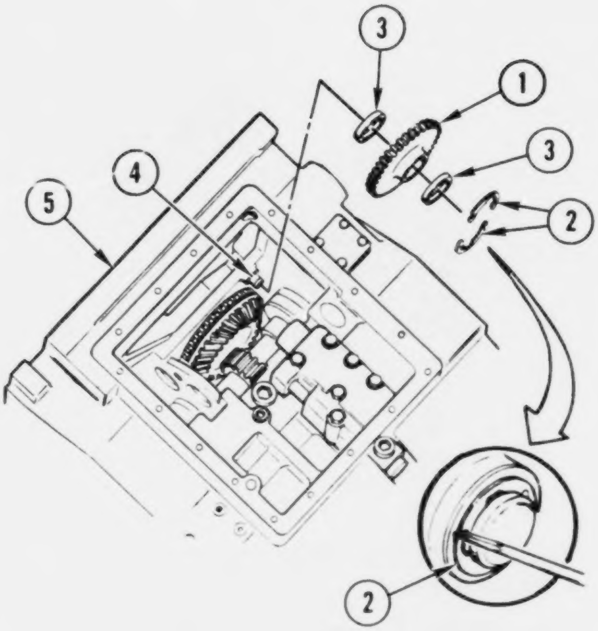
19. INSPECT MAKEUP PUMP SHOULDERED SHAFT (4).

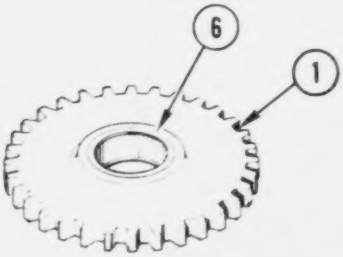
   a. Inspect shaft (4) for damage. See page 2-5.

   b. If shaft (4) is damaged, go to step 19.1. If not, go to step 20.

19.1 REPLACE TRANSMISSION (5). RECORD FAILURE ON DA FORM 2407 AND RETURN REASSEMBLED DEFECTIVE TRANSMISSION TO DEPOT.

19.2 EFFORT IS COMPLETE. GO TO END OF TASK.

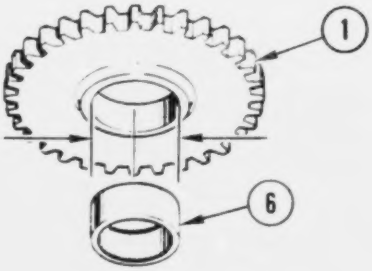




20. INSPECT ROLLER BEARING (6) IN GEAR (1).

   a. Inspect bearing (6) for damage. See TM 9-214.

   b. If bearing (6) is damaged, go to step 21. If not, go to step 23.

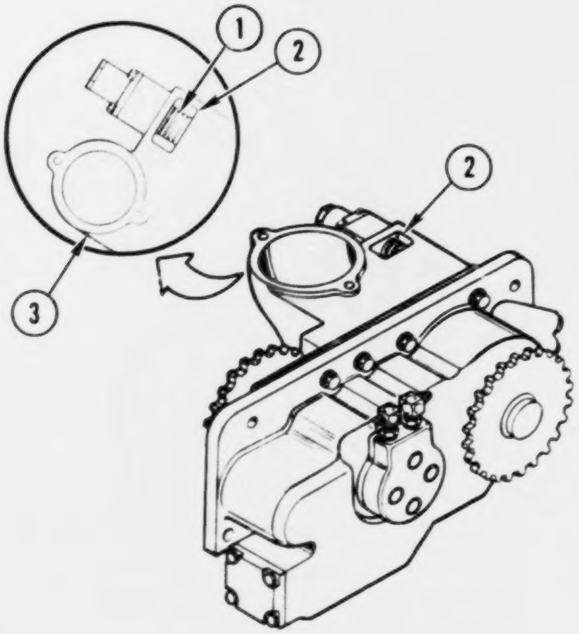


21. REMOVE BEARING (6).

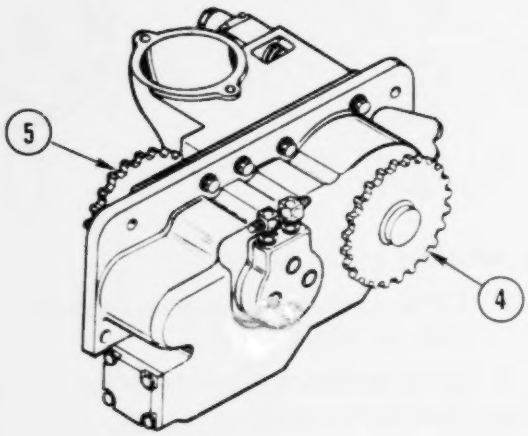
   a. Using arbor press and bearing installer, press out and discard bearing (6).

22. CHECK GEAR (1).

   a. Using telescoping gage set and micrometer caliper set, measure inside diameter of gear (1). Replace gear if measurement is greater than 1.001 inches (25.43 mm).



23. INSPECT CONTROL VALVE PISTON GROOVES (1).
    a. If four grooves (1) are visible through port opening (2), go to step 24.
    b. If four grooves (1) are not visible, go to step 25.1.



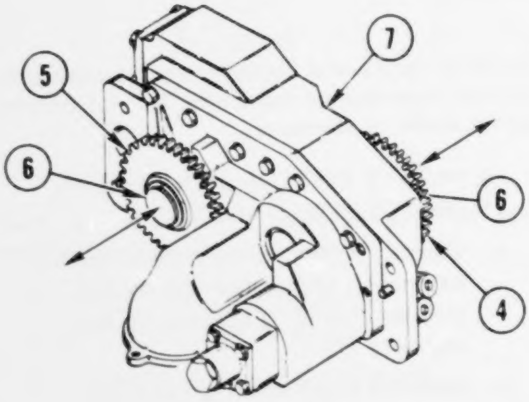
24. ROTATE PUMP SPUR GEARS (4) AND (5).
    a. If there is no binding when spur gears (4) and (5) are rotated, go to step 25.
    b. If there is binding when spur gears (4) and (5) are rotated, go to step 25.1.

NOTE

Spur gear may move on pump shaft. This is not end play. Pump shaft must move in and out of the housing.

25. CHECK END PLAY BETWEEN PUMP SHAFTS (6) AND HOUSING (7).
    a. Grasp gears (4) and (5) and move shafts (6) in and out of housing (7).
    b. If there is end play in both shafts (6), go to step 26. If not, go to step 25.1.

25.1 REPLACE PUMP. RECORD FAILURE ON DA FORM 2407 AND RETURN DEFECTIVE PUMP TO DEPOT. GO TO STEP 40.



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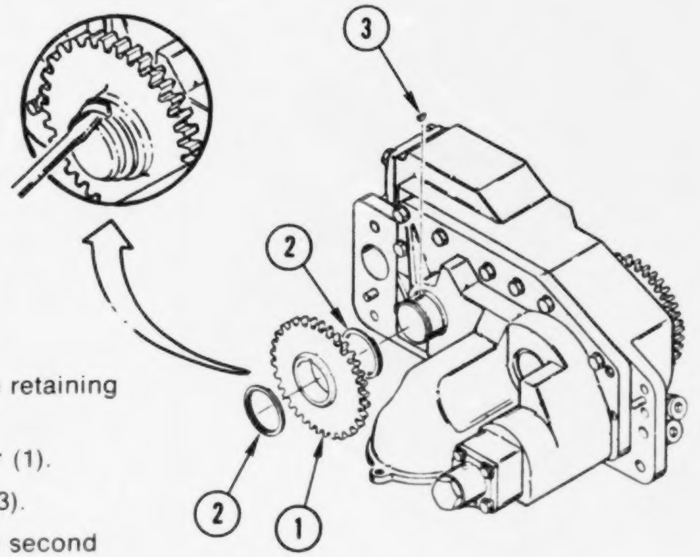


26. REMOVE SPUR GEAR (1).

   a. Using screwdriver, remove retaining ring (2). Discard ring.

   b. Using prybar, remove gear (1).

   c. Remove and discard key (3).

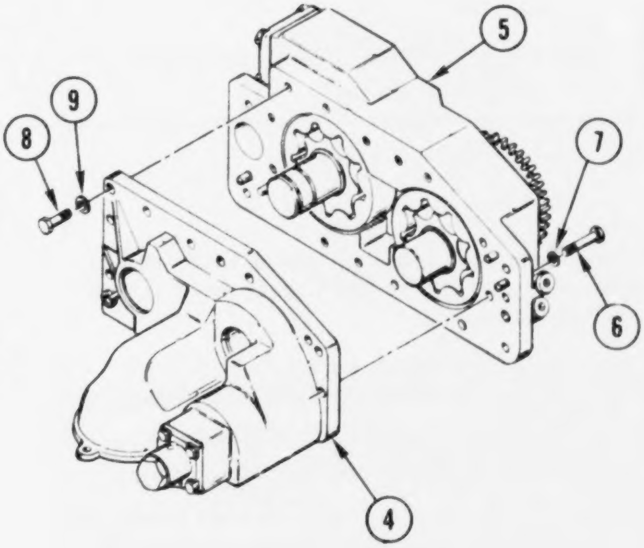
   d. Using screwdriver, remove second retaining ring (2). Discard ring.

CAUTION

Do not scratch, nick or mar mating surfaces of pump housings. Damage to equipment can result.

NOTE

Pump elements and housings are matched sets. Do not interchange housings. Do not remove pump shafts or elements.

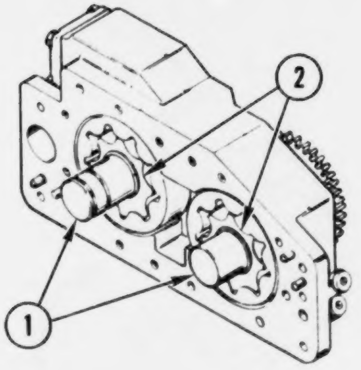


27. SEPARATE BOTTOM HOUSING (4) FROM TOP HOUSING (5).

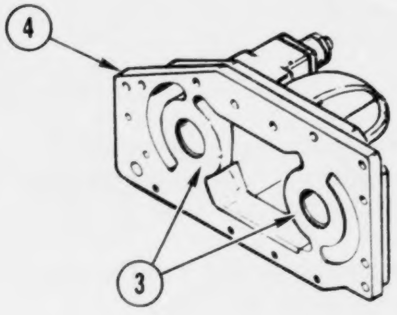
   a. Using 1/4-inch drive rachet handle, extension and 7/16-inch socket, remove five long screws (6) and washers (7).

   b. Remove eight short screws (8) and washers (9).

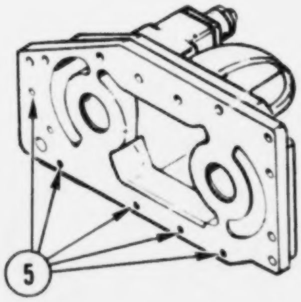
   c. Separate housings (4) and (5).



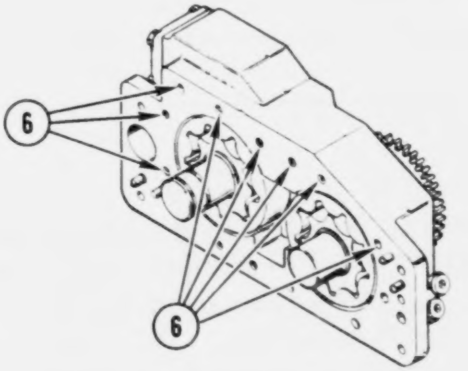
28. ROTATE PUMP SHAFTS (1).
    a. If shafts (1) and inner pump elements (2) rotate, go to step 29.
    b. If either shaft (1) or inner pump element (2) does not rotate, go to step 39.1.



29. INSPECT INNER SURFACES (3) OF BOTTOM HOUSING (4) FOR GOUGING.
    a. If inner surfaces (3) are not damaged, go to step 30.
    b. If either inner surface (3) is damaged, go to step 39.1



30. INSPECT BOTTOM HOUSING INSERTS (5). See page 2-5.
    a. If inserts (5) are not damaged, go to step 31.
    b. If any insert (5) is damaged, go to step 39.1.



NOTE

Pump elements are a matched set. Do not remove pump shafts or elements.

31. INSPECT TOP HOUSING INSERTS (6). See page 2-5.
    a. If inserts (6) are not damaged, go to step 32.
    b. If any insert (6) is damaged, go to step 39.1

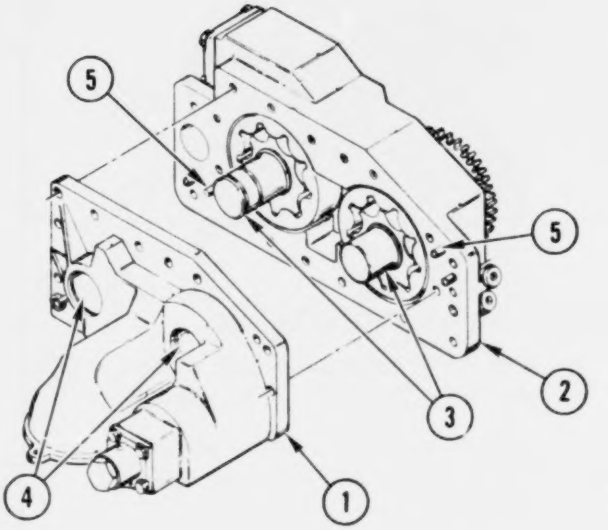
GO TO NEXT PAGE

INSTALL

32. IF PUMP HOUSINGS WERE SEPARATED FOR INSPECTION, GO TO STEP 34.

33. IF PUMP IS BEING REPLACED, GO TO STEP 40.

34. JOIN HOUSING (1) TO HOUSING (2).
    a. Coat shafts (3) and bushings (4) with transmission oil.
    b. Aline dowel pins (5) in top housing (2) with pilot holes in bottom housing (1).
    c. Join housings (1) and (2).
    d. Check shafts (3) for free rotation.
    e. If shafts (3) do not rotate freely, go to step 27.



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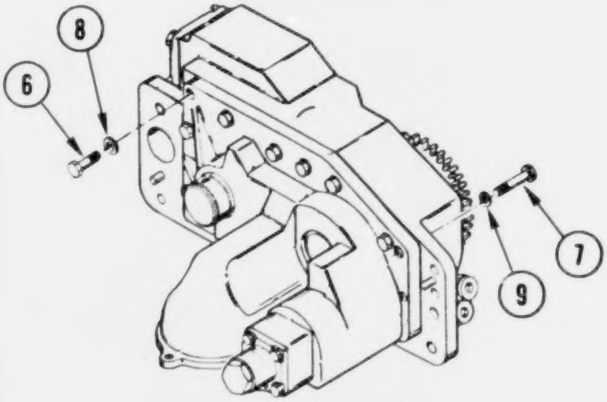
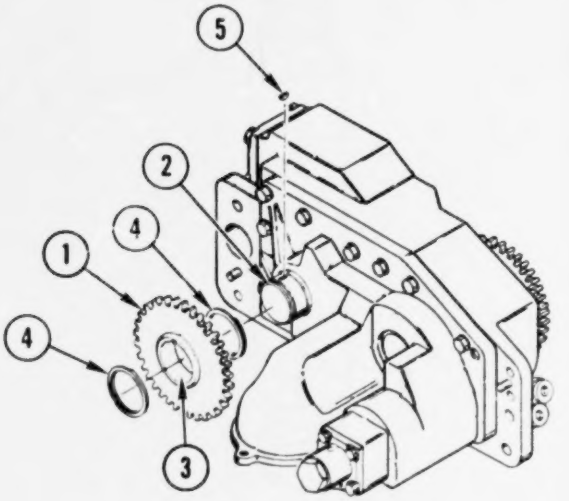
35. INSTALL EIGHT SHORT SCREWS (6) AND FIVE LONG SCREWS (7).
    a. Install eight washers (8) and short screws (6).
    b. Install five washers (9) and long screws (7).

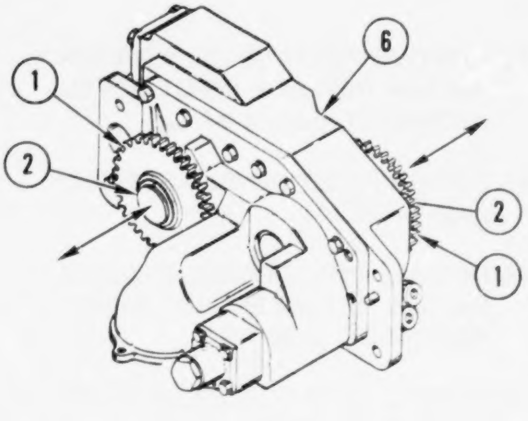


36. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, EVENLY TORQUE EIGHT SCREWS (6) TO 100-120 in-lb (115-138 cmkg).

37. USING 1/4-INCH DRIVE TORQUE WRENCH, EXTENSION AND 7/16-INCH SOCKET, EVENLY TORQUE FIVE SCREWS (7) TO 100-120 in-lb (115-138 cmkg).



38. INSTALL GEAR (1) ON SHAFT (2).
    a. Coat shaft (2) and bearing (3) with transmission oil.
    b. Install new retaining ring (4).
    c. Install new key (5) and gear (1).
    d. Install second new retaining ring (4).



NOTE

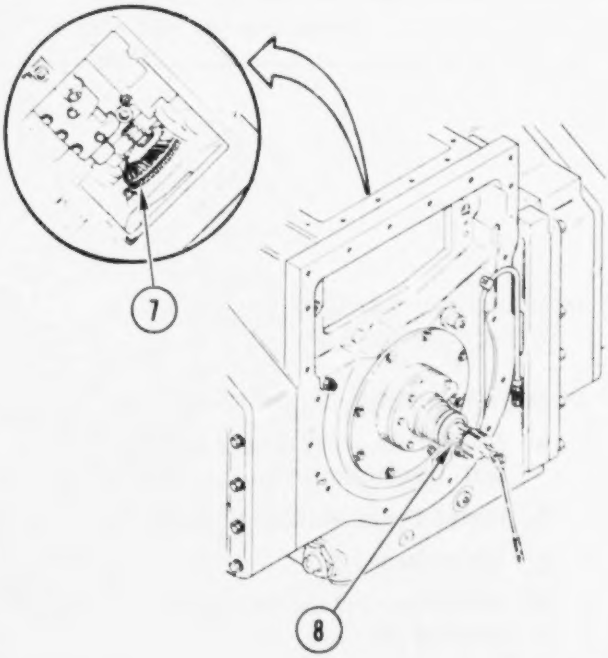
The spur gear may move on pump shaft. This is not end play. The shaft must move in and out of the housing.

39. CHECK END PLAY BETWEEN PUMP SHAFTS (2) AND HOUSING (6).
    a. Grasp gear (1) and move shafts (2) in and out of housing (6).
    b. If there is end play in both shafts (2), go to step 40. If not, go to step 27.

39.1 REPLACE PUMP. RECORD FAILURE ON DA FORM 2407 AND RETURN REASSEMBLED DEFECTIVE PUMP TO DEPOT.

40. INSPECT MAIN HOUSING INSERTS. See page 2-5.
    a. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.

41. INSPECT SPUR GEAR TEETH (7)
    a. Using drag wrench, rotate input shaft (8) slowly to inspect gear teeth (7).
    b. If gear teeth (7) are damaged, go to step 42. If not, go to step 45.



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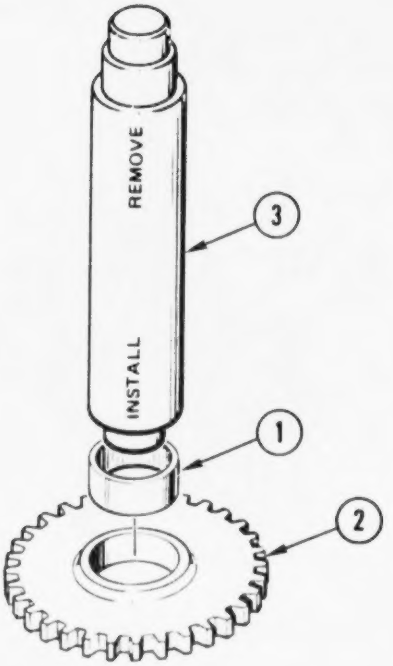
42. REMOVE INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

43. REPAIR INPUT BEVEL ASSEMBLY, page 4-126.

44. INSTALL INPUT BEVEL ASSEMBLY. See task REPLACE INPUT BEVEL ASSEMBLY, page 4-94.

45. INSTALL NEW ROLLER BEARING (1) IN SPUR GEAR (2).
    a. If bearing (1) was removed from gear (2), go to step 45b. If not, go to step 46.
    b. Coat new bearing with transmission oil.
    c. Using bearing installer (3) and arbor press, press bearing (1) into gear (2). See TM 9-214.



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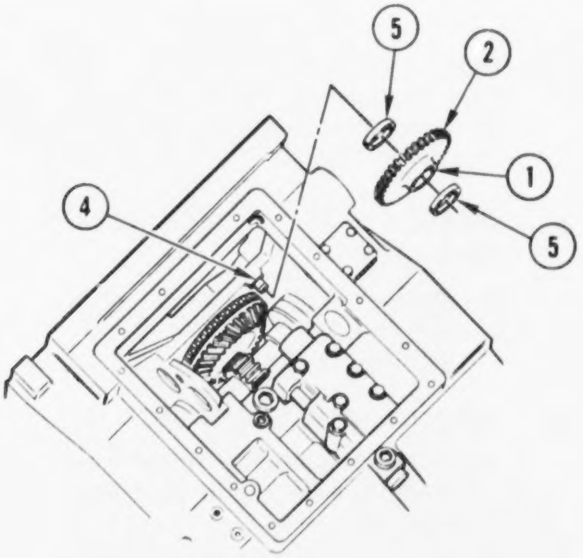
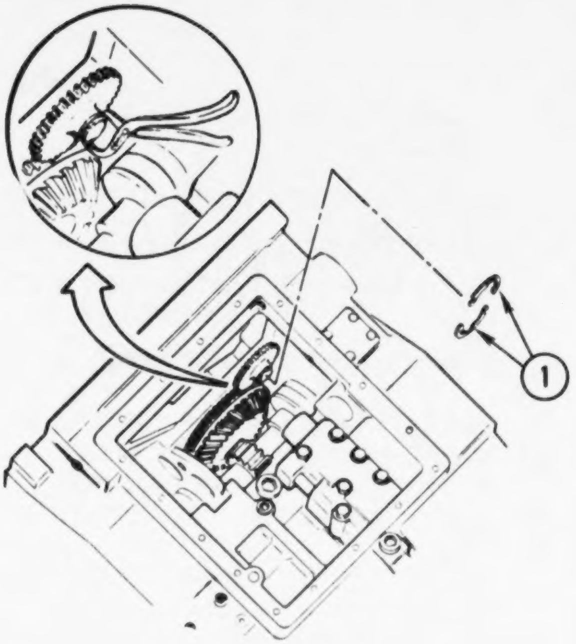
46. POSITION TRANSMISSION BOTTOM SIDE UP.

47. INSTALL GEAR (2) ON SHAFT (4).
    a. Coat shaft (4) and bearing (1) with transmission oil.
    b. Install thrust washer bearing (5).
    c. Install gear (2).
    d. Install second thrust washer bearing (5).

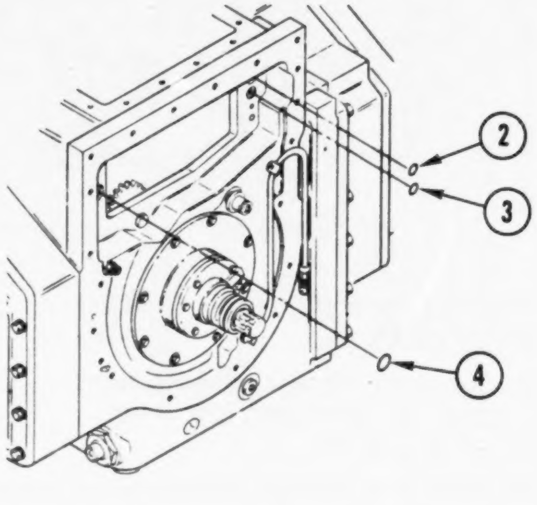




CAUTION

Use care when installing retaining ring. Pieces may fall into transmission during installation. Damage to equipment can occur.

48. INSTALL NEW TWO-PIECE RETAINING RING (1).
    a. Using slip-joint pliers, install retaining ring (1) with sharp edge out.



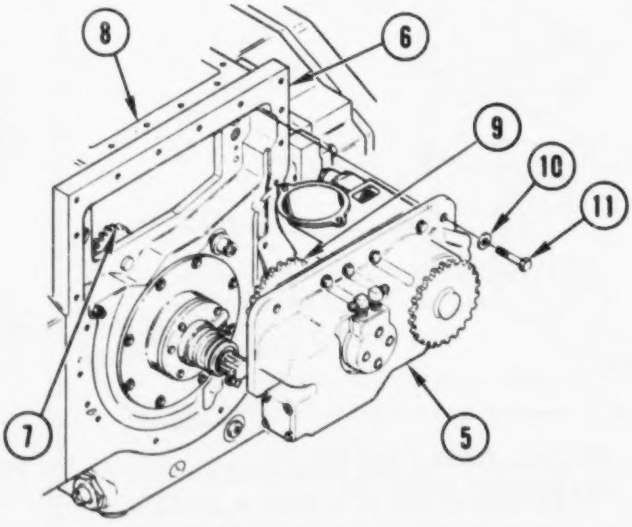
49. INSTALL THREE NEW PREFORMED PACKINGS (2), (3), AND (4).
    a. Coat three new preformed packings (2), (3), and (4) with transmission oil and install.

CAUTION

Do not install pump without fully meshing mating gears. Damage to equipment can occur.

50. INSTALL PUMP (5).
    a. Position pump (5) in transmission housing (6). Rotate gear (7) through sump opening (8) to allow meshing of teeth with those of spur gear (9).
    b. Install four washers (10) and screws (11).

51. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE FOUR SCREWS (11) TO 35-40 ft-lb (5-6 mkg).



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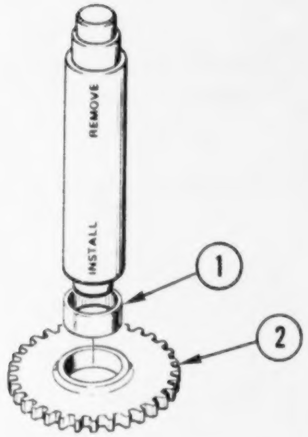
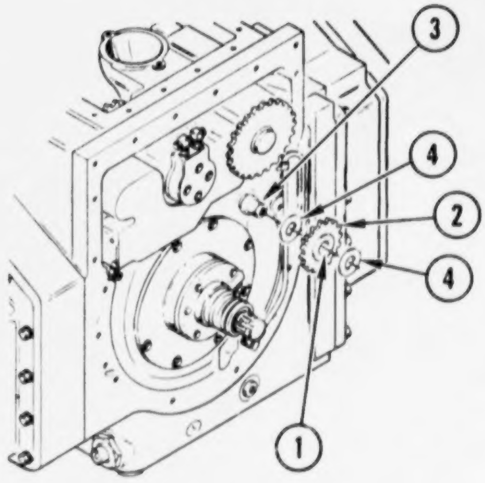
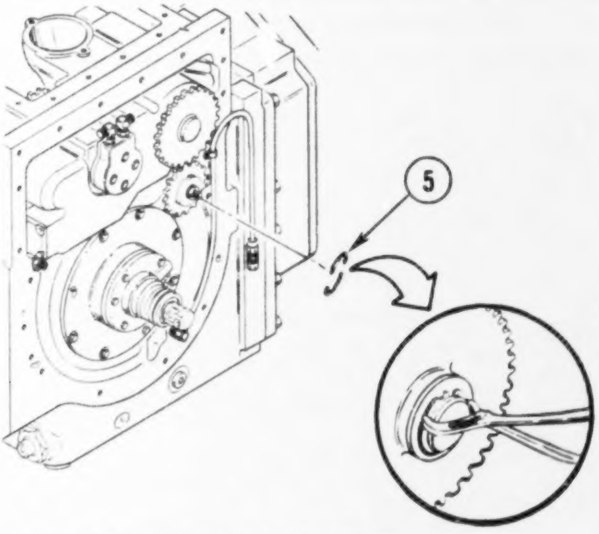


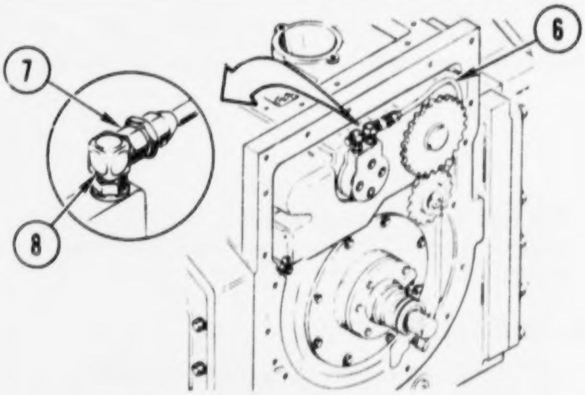
52. INSTALL NEW BEARING (1) IN SPUR GEAR (2).
    a. If bearing (1) was removed from gear (2), go to step 52b. If not, go to step 53.
    b. Coat new bearing (1) with transmission oil.
    c. Using arbor press and bearing installer, press bearing (1) into spur gear (2). See TM 9-214.



53. INSTALL SPUR GEAR (2).
    a. Coat shaft (3) and bearing (1) with transmission oil.
    b. Install thrust washer bearing (4).
    c. Install gear (2).
    d. Install second thrust washer bearing (4).



54. INSTALL NEW TWO-PIECE RETAINING RING (5).
    a. Using slip-joint pliers, install ring (5) with sharp edge out.



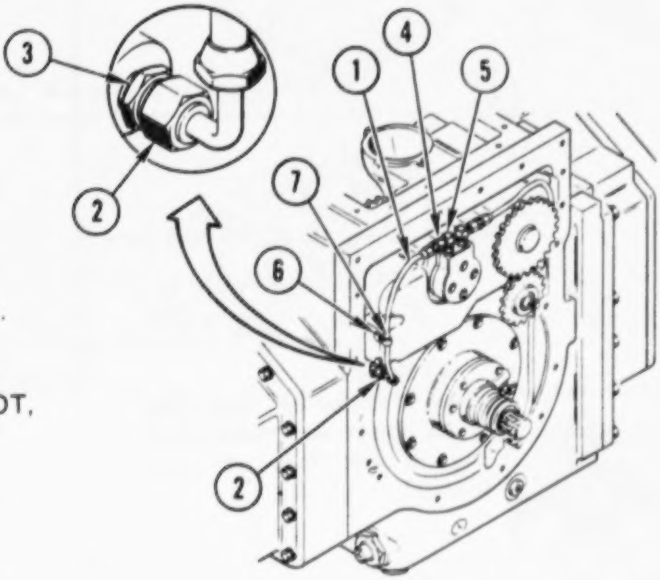
55. CONNECT HOSE ASSEMBLY (6).
    a. Connect nut (7) to hose to boss elbow (8).

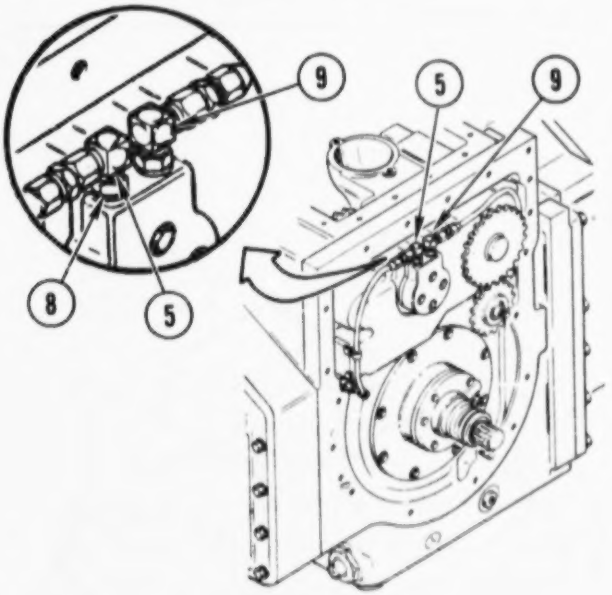
56. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (7) TO 125-135 in-lb (144-155 cmkg).

57. INSTALL HOSE ASSEMBLY (1).
    a. Connect nut (2) to adapter (3).
    b. Connect nut (4) to hose to boss elbow (5).
    c. Install screw (6) through clamp (7).

58. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUTS (2) AND (4) TO 125-135 in-lb (144-155 cmkg).

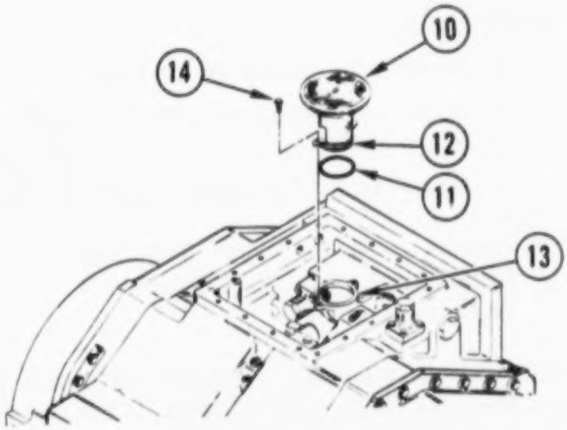
59. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE SCREW (6) TO 100-120 in-lb (115-138 cmkg).





60. HOLD ELBOW (5), USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE ELBOW NUT (8) TO 125-135 in-lb (144-155 cmkg).

61. REPEAT STEP 60 FOR ELBOW (9).



62. INSTALL SCREEN (10).
    a. Coat new preformed packing (11) with transmission oil. Install packing in groove (12).
    b. Hold screen (10) on mounting surface (13) and install two screws (14).

63. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE TWO SCREWS (14) TO 120-145 in-lb (138-167 cmkg).

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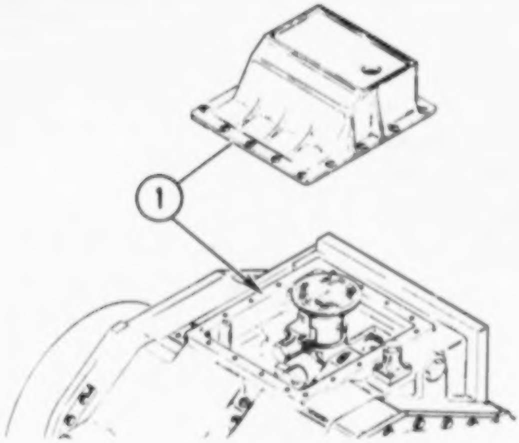
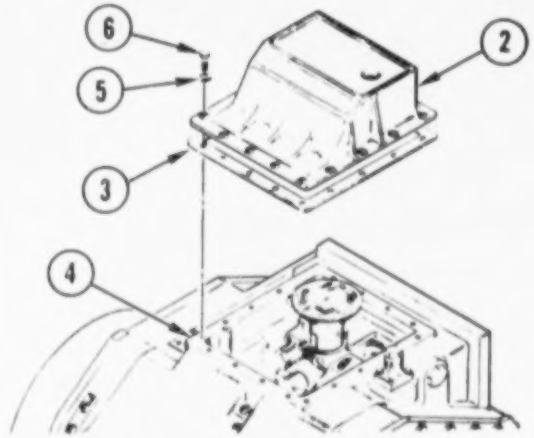


WARNING

Solvent fumes can burn and could poison you. Read warning in the front of this manual.

64. CLEAN MATING SURFACES (1).
    a. Use wiping rag dampened with cleaning solvent.



65. INSTALL SUMP COVER (2).
    a. Position new gasket (3) and sump cover (2) on housing (4).
    b. Install 17 new lock washers (5) and bolts (6).

66. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 17 BOLTS (6) TO 15-20 ft-lb (2-3 mkg).

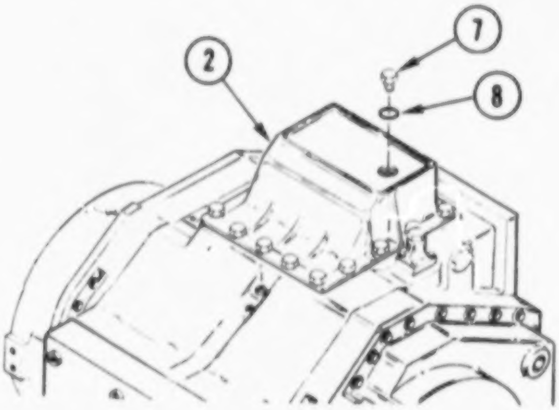
67. INSTALL PLUG (7).
    a. Install new gasket (8) on plug (7).
    b. Apply sealant compound to threads of plug (7).
    c. Install plug (7) in sump cover (2).

68. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE PLUG (7) TO 55-60 ft-lbs (8 mkg).

69. INSTALL POWER TAKEOFF ASSEMBLY. See task REPLACE POWER TAKEOFF ASSEMBLY, page 4-140.

70. INSTALL DISCONNECT CLUTCH ASSEMBLY. See task REPLACE DISCONNECT CLUTCH ASSEMBLY, page 4-78.

71. INSTALL DISCONNECT CLUTCH. See task REPLACE DISCONNECT CLUTCH, page 4-52.



END OF TASK

REPAIR AUXILIARY MAKEUP PUMP

DESCRIPTION

This task covers: Disassemble (page 4-497). Assemble (page 4-498).

INITIAL SETUP

Tools:

General mechanic's tool kit:
automotive — (Item 33, App C)

Materials/Parts:

Transmission oil — (Item 12, App B)
Preformed packing (2)
Retaining ring (3)
Woodruff key (2)

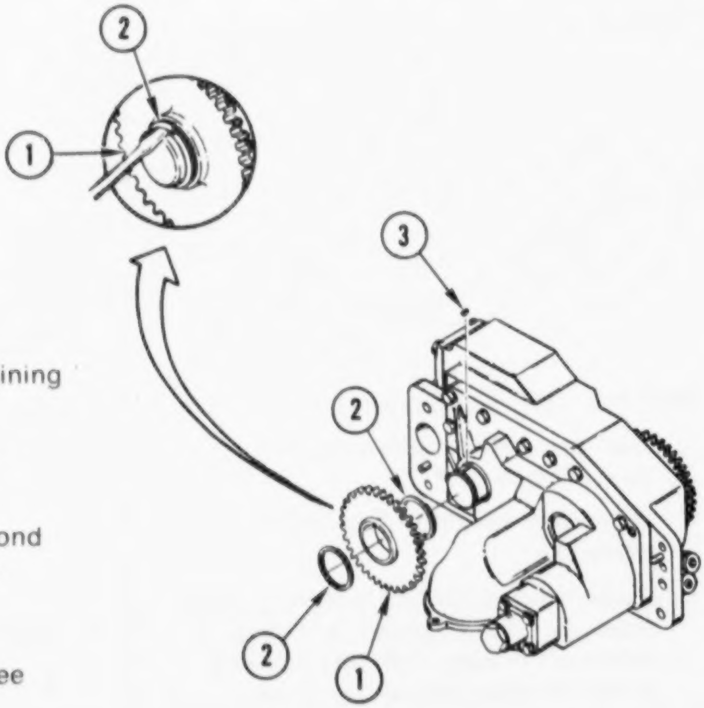
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Auxiliary makeup pump on workbench. See page 4-482.

DISASSEMBLE



1. REMOVE SPUR GEAR (1).
   a. Using screwdriver, remove retaining ring (2). Discard ring.
   b. Using prybar, remove gear (1).
   c. Remove and discard key (3).
   d. Using screwdriver, remove second retaining ring (2). Discard ring.
2. INSPECT GEAR (1).
   a. Inspect gear (1) for damage. See page 2-5.
   b. Replace gear (1) if damaged.

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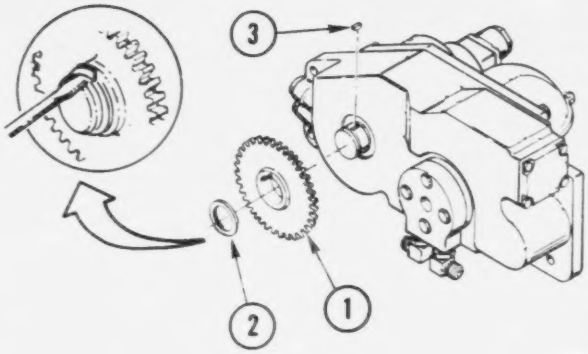
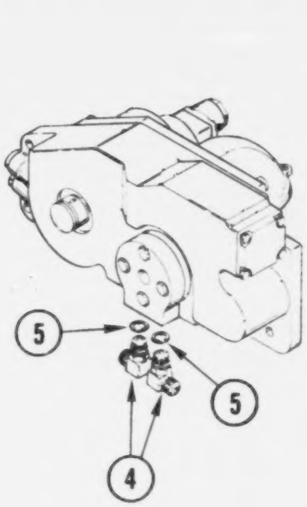


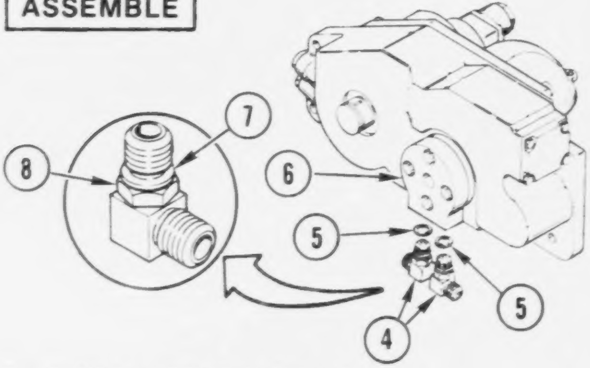
3. REMOVE GEAR (1).
   a. Using screwdriver, remove retaining ring (2). Discard ring.
   b. Using prybar, remove gear (1).
   c. Remove and discard key (3).

4. INSPECT GEAR (1).
   a. Inspect gear (1) for damage. See page 2-5.
   b. Replace gear (1) if damaged.

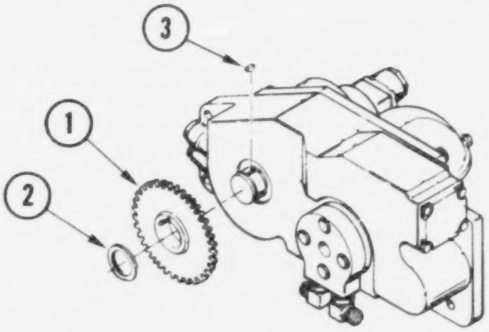


5. REMOVE TWO HOSE TO BOSS ELBOWS (4).
   a. Remove two elbows (4) and preformed packings (5). Discard packings.

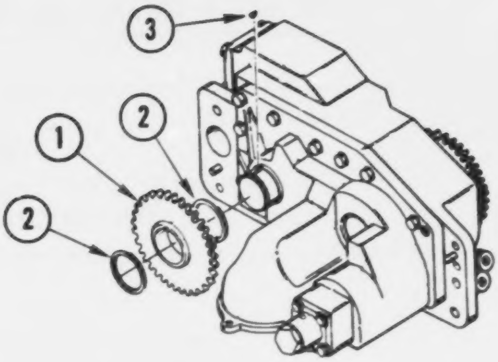
ASSEMBLE



6. INSTALL TWO ELBOWS (4).
   a. Coat two new packings (5) with transmission oil.
   b. Install one packing (5) on each elbow (4).
   c. Screw elbows (4) into metering pump cover (6). Hand tighten until captive washers (7) make firm contact with cover. Position elbows for hose installation.
   d. Tighten nuts (8).



7. INSTALL GEAR (1).
   a. Install new key (3).
   b. Install gear (1).
   c. Install new retaining ring (2).



8. INSTALL GEAR (1).
   - a. Install new retaining ring (2).
   - b. Install new key (3).
   - c. Install gear (1).
   - d. Install second new retaining ring (2).

END OF TASK

Section XXII. THIRD RANGE RELAY VALVE ASSEMBLY

TASK INDEX

Task	Page
Replace Third Range Relay Valve Assembly	4-502
Repair Third Range Relay Valve Assembly	4-506

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE THIRD RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-502). Install (page 4-504).

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Machinist's vise — (Item 47, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Cleaning solvent — (Item 1, App B)
- Transmission oil — (Item 12, App B)
- Wiping rag — (Item 13, App B)
- Transmission repair kit

Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

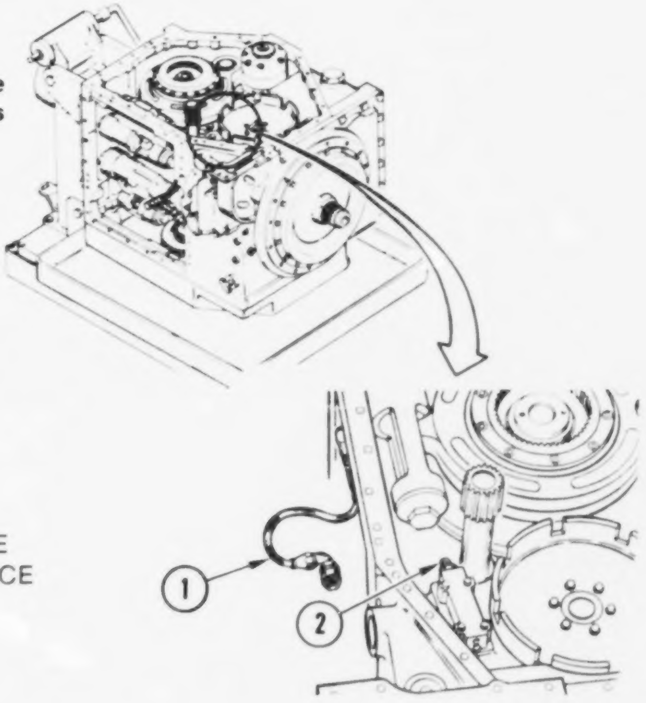
Transmission mounted on tip-over stand. See page 2-144.

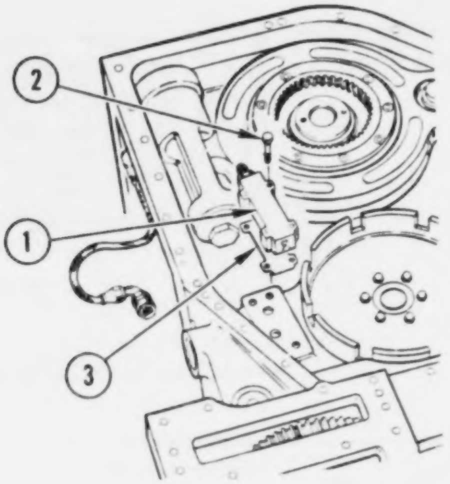
NOTE

Third range relay valve may not look like that shown in this task. However this procedure applies to all valves in use.

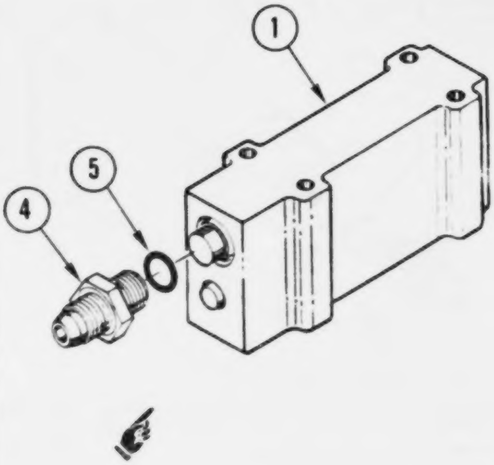
REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.
3. REMOVE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.
4. DISCONNECT HOSE ASSEMBLY (1) FROM ADAPTER (2).



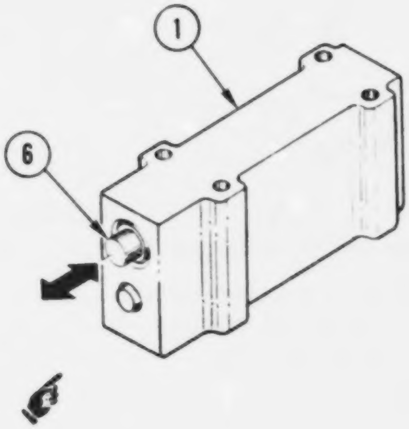


5. REMOVE THIRD RANGE RELAY VALVE ASSEMBLY (1).
   a. Using 3/8-inch drive ratchet handle, extension, and 7/16-inch socket, remove four screws (2).
   b. Remove valve assembly (1).
   c. Remove and discard gasket (3).



6. REMOVE ADAPTER (4).
   a. Place valve assembly (1) in vise.
   b. Remove adapter (4) and preformed packing (5).
   c. Discard packing (5).

7. INSPECT DIRECTIONAL CONTROL SLIDE (6) FOR FREE MOVEMENT IN VALVE ASSEMBLY (1)
   a. If slide (6) is stuck in valve assembly (1), go to step 8. If not, go to step 9.
8. REPAIR THIRD RANGE RELAY VALVE ASSEMBLY, page 4-506.
9. INSPECT MAIN HOUSING INSERTS.
   a. Inspect assembly, hardware, and inserts. See page 2-5.
   b. Repair inserts, if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



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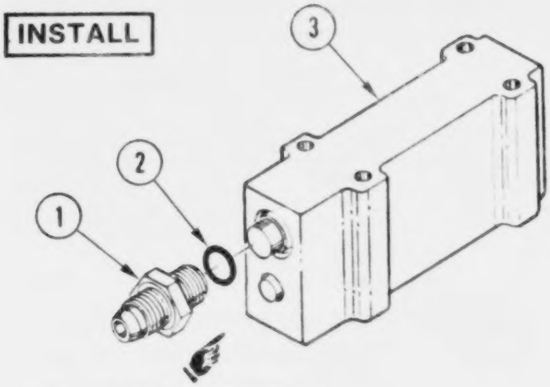
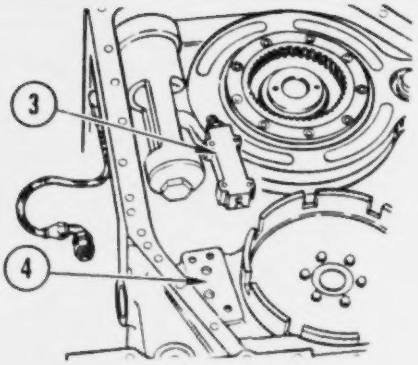
INSTALL



10. INSTALL ADAPTER (1).
    a. Coat new preformed packing (2) with transmission oil.
    b. Install packing (2) on adapter (1).
    c. Install adapter (1).

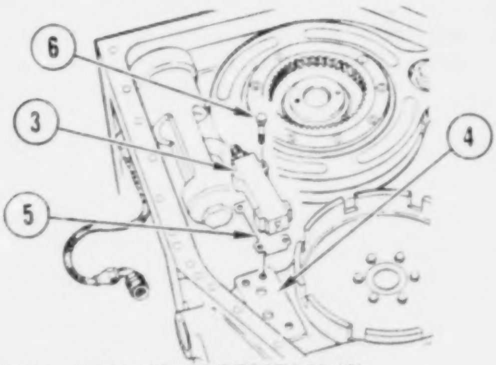
11. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE ADAPTER (1) TO 40-45 ft-lbs (6 mkg).

12. REMOVE VALVE ASSEMBLY (3) FROM VISE.



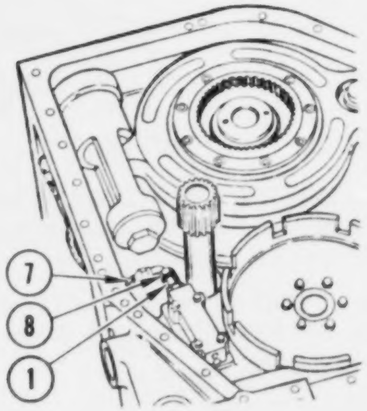
WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

13. CLEAN GASKET MOUNTING SURFACE OF VALVE ASSEMBLY (3) AND HOUSING (4).
    a. Use wiping rag dampened with cleaning solvent.



14. INSTALL VALVE ASSEMBLY (3).
    a. Position new gasket (5) and valve assembly (3) on housing (4). Aline all screw holes.
    b. Install four screws (6).

15. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (6) TO 120-145 in-lb (138-167 cmkg).



16. CONNECT HOSE ASSEMBLY (7) TO ADAPTER (1).

17. USING 3/8-INCH DRIVE TORQUE WRENCH AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (8) TO 125-135 in-lb (144-155 cmkg).

18. INSTALL RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE RIGHT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-170.

19. INSTALL RIGHT-HAND OUTPUT HOUSING. See task REPLACE RIGHT-HAND OUTPUT HOUSING, page 4-270.

20. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR THIRD RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-506). Assemble (page 4-509).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Machinist's vise — (Item 47, App C)
- Micrometer caliper set — (Item 52, App C)
- Retaining-ring pliers — (Item 61, App C)
- Small hole gage set — (Item 72, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 82, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Transmission oil — (Item 12, App B)
- Preformed packing
- Preformed packing
- Retaining ring
- Retaining ring

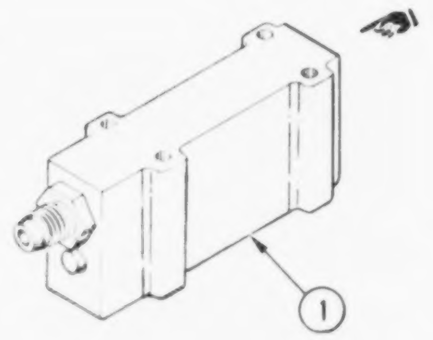
Personnel Required:

Track Veh Rep 63H10

Equipment Conditions:

Third range relay valve assembly on workbench. See page 4-502.

DISASSEMBLE



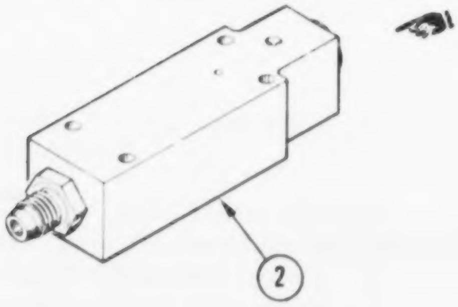
NOTE
Two types of third range relay valve assembly are in use. Portions of these procedures apply to each valve assembly.

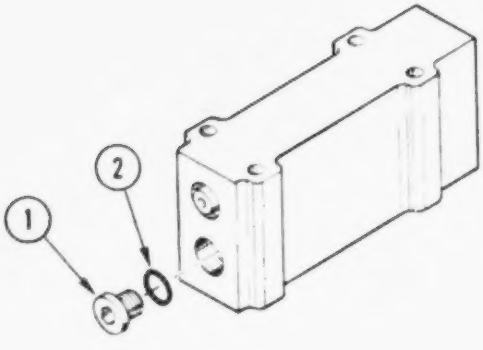
1. PLACE THIRD RANGE RELAY VALVE ASSEMBLY IN VISE.

1.1 INSPECT VALVE ASSEMBLY AND DETERMINE TYPE.

   a. If valve assembly is type (1), go to step 2.

   b. If valve assembly is type (2), go to step 14.1.





2. REMOVE PLUG (1).
   a. Using 1/2-inch drive ratchet handle with adapter and 1/4-inch socket wrench attachment, carefully remove plug (1).
   b. Remove and discard preformed packing (2).

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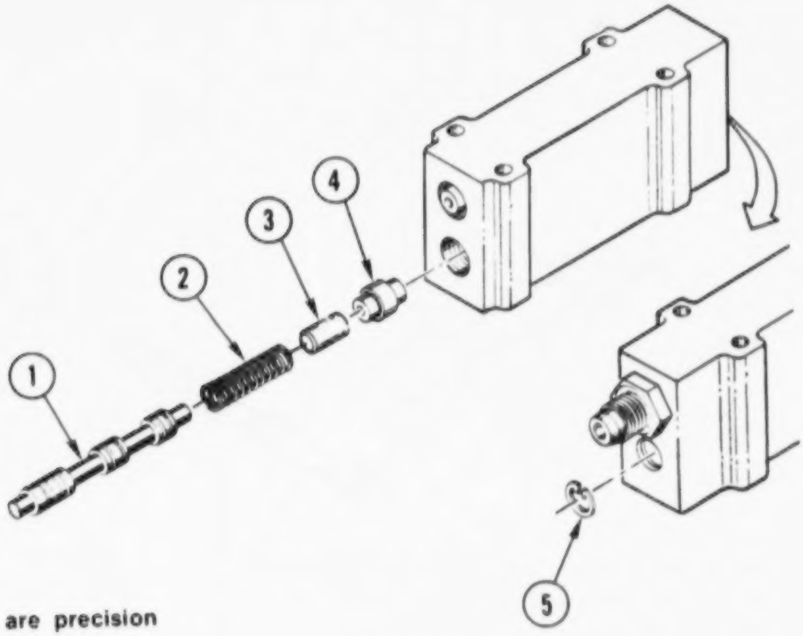
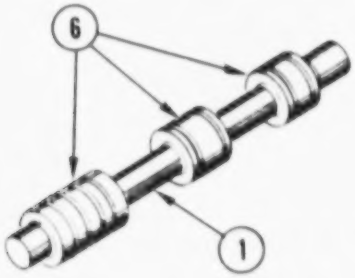


CAUTION

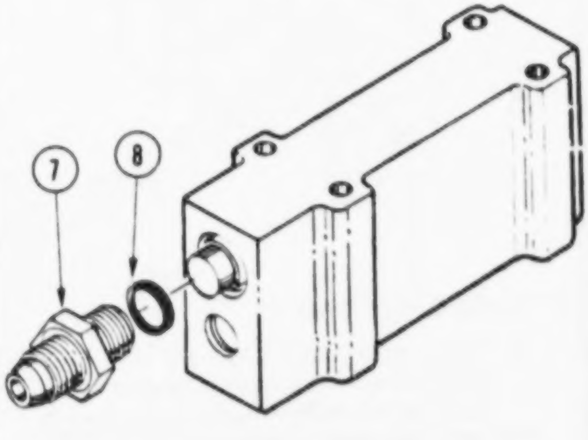
Valve assembly moving parts are precision fit. Do not drop, scratch, or nick any parts. Damage to equipment can occur.

3. REMOVE DIRECTIONAL SLEEVE (1), SPRING (2), PLUG (3), AND RETAINER (4).

4. USING RETAINING-RING PLIERS, REMOVE AND DISCARD RETAINING RING (5).



5. CHECK SLEEVE (1).
   a. Using micrometer caliper set, measure three diameters (6).
   b. Replace sleeve (1) if any measurement is less than 0.4995 inch (12.687 mm).



6. REMOVE ADAPTER (7) AND PREFORMED PACKING (8). DISCARD PREFORMED PACKING.

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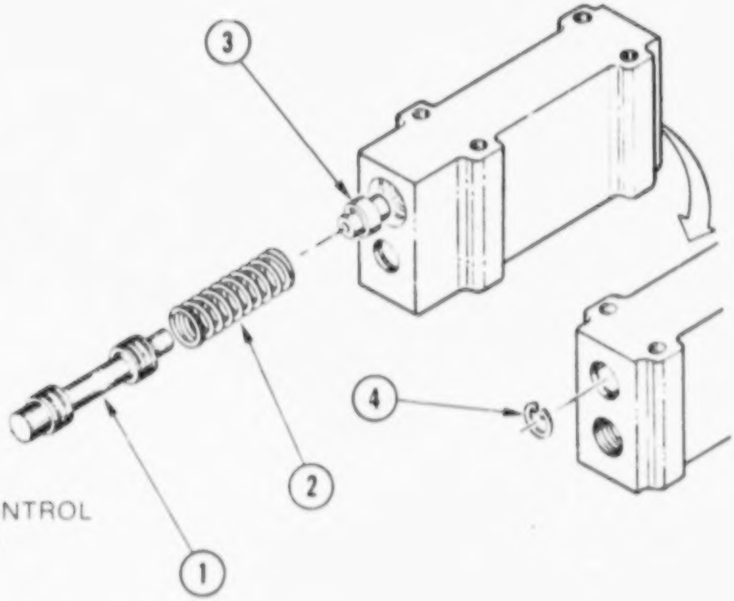
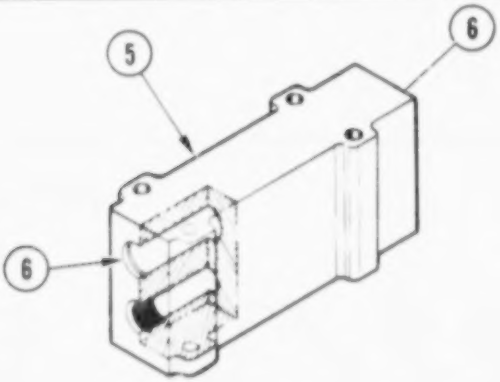
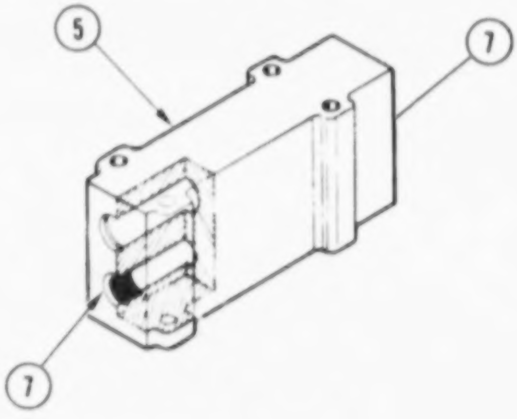


7. REMOVE DIRECTIONAL CONTROL SLIDE (1), SPRING (2), AND RETAINER (3).

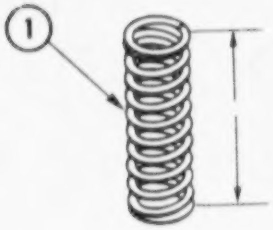
8. USING RETAINING-RING PLIERS, REMOVE RETAINING RING (4). DISCARD RETAINING RING.



9. CHECK HOUSING (5).
   a. Using small hole gage set and micrometer caliper set, measure bore (6) in both ends of housing (5). Do not measure threads.
   b. If either measurement of bore (6) is greater than 0.6256 inch (15.890 mm), replace valve assembly and go to step 14.5. If not, go to step 10.



10. CHECK HOUSING (5).
   a. Using small hole gage set and micrometer caliper set, measure bore (7) in both ends of housing (5). Do not measure threads.
   b. If either measurement of bore (7) is greater than 0.5006 inch (12.715 mm), replace valve assembly and go to step 14.5. If not, go to step 11.



11. CHECK SPRING (1).

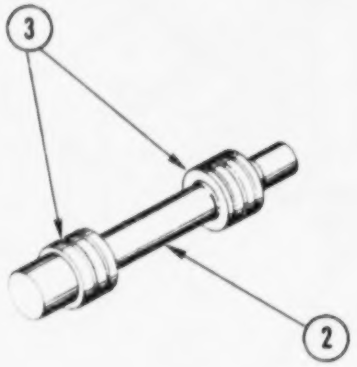
   a. Using indicator caliper, measure free length of spring (1). Replace spring if free length is less than 1.90 inches (48.3 mm).

12. CLEAN THIRD RANGE RELAY VALVE ASSEMBLY.

   a. Clean assembly and hardware. See page 2-2.

13. INSPECT THIRD RANGE RELAY VALVE ASSEMBLY.

   a. Inspect assembly and hardware. See page 2-5.

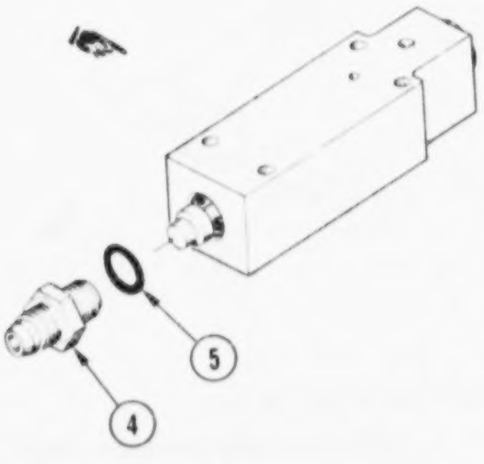


14. CHECK SLIDE (2).

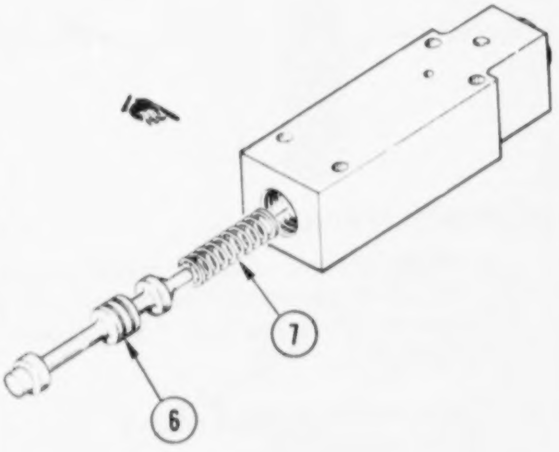
   a. Using micrometer caliper set, measure two diameters (3).

   b. Replace slide (2) if either measurement is less than 0.6241 inch (15.852 mm).

   c. Go to step 15.



14.1 REMOVE ADAPTER (4) AND PREFORMED PACKING (5). DISCARD PREFORMED PACKING.

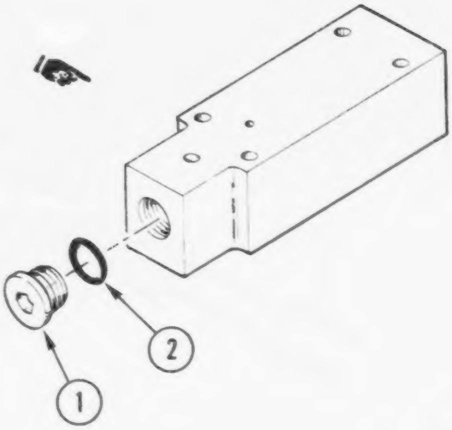


CAUTION

Valve assembly moving parts are precision fit. Do not drop, scratch, or nick any parts. Damage to equipment can occur.

14.2 REMOVE DIRECTIONAL CONTROL SLIDE (6) AND SPRING (7).

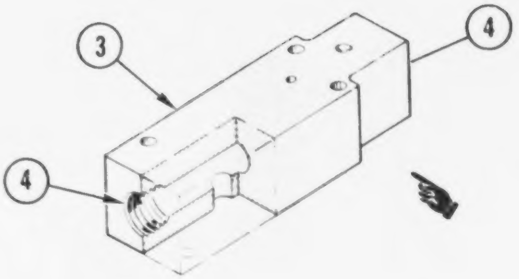
GO TO NEXT PAGE



14.3 REMOVE PLUG (1).

a. Using 1/2-inch drive ratchet handle with adapter and 1/4-inch socket wrench attachment, carefully remove plug (1).

b. Remove and discard preformed packing (2).

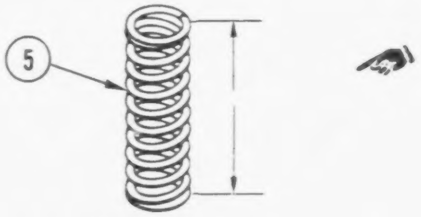


14.4 CHECK HOUSING (3)

a. Using small hole gage set and micrometer caliper set, measure bore (4) in both ends of housing (3). Do not measure threads.

b. If either measurement of bore (4) is greater than 0.6256 inch (15.890 mm), replace valve assembly and go to step 14.5. If not, go to step 14.6.

14.5 EFFORT IS COMPLETE. GO TO END OF TASK.



14.6 CHECK SPRING (5).

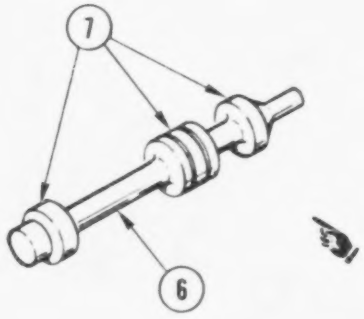
a. Using indicator caliper, measure free length of spring (5). Replace spring if free length is less than 1.90 inches (48.3 mm).

14.7 CLEAN THIRD RANGE RELAY VALVE ASSEMBLY.

a. Clean assembly and hardware. See page 2-2.

14.8 INSPECT THIRD RANGE RELAY VALVE ASSEMBLY.

a. Inspect assembly and hardware.See page 2-5.



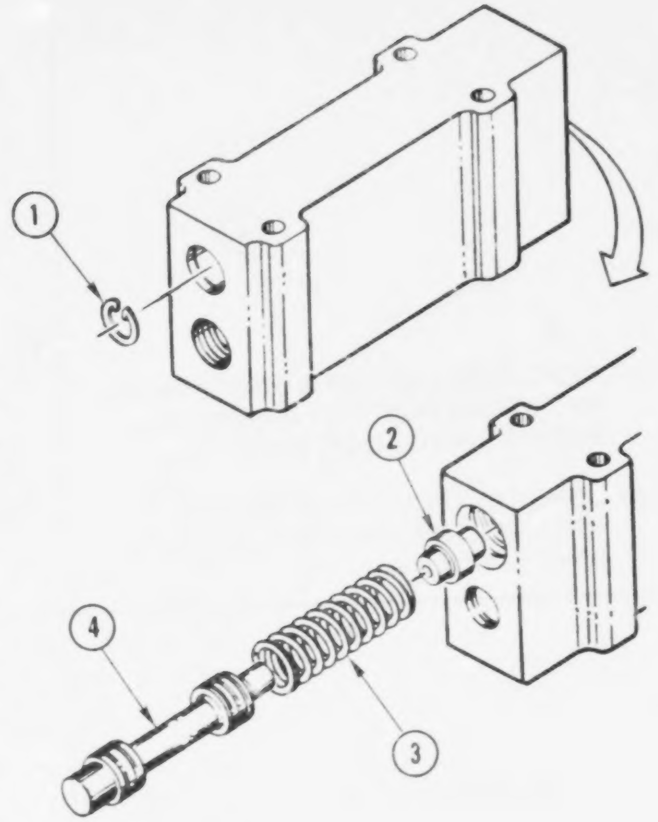
14.9 CHECK SLIDE (6).

a. Using micrometer caliper set, measure three diameters (7)

b. Replace slide (6) if any measurement is less than 0.6241 inch (15.852 mm).

c. Go to step 29.

ASSEMBLE



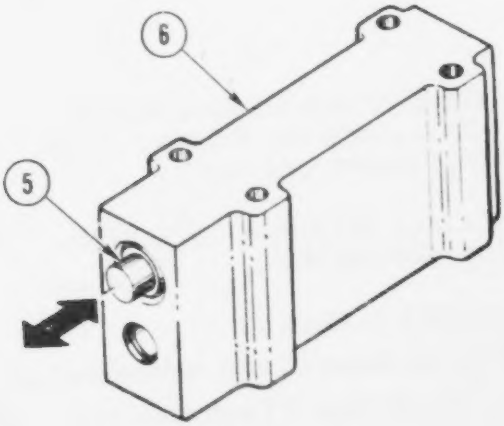
CAUTION

Valve assembly moving parts are precision fit. Do not drop, scratch, or nick any parts. Damage to equipment can occur.

15. USING RETAINING-RING PLIERS, INSTALL NEW RETAINING RING (1) WITH SHARP SIDE OUT.

16. INSTALL RETAINER (2) AND SPRING (3).

17. INSTALL SLIDE (4).
    a. Coat slide (4) with transmission oil.
    b. Install slide (4) with small diameter end toward spring (3).



18. CHECK THAT SLIDE (5) MOVES FREELY IN HOUSING (6).
    a. Push in and release slide (5) several times.
    b. If slide (5) moves freely in housing (6), go to step 19. If not, go to step 7.

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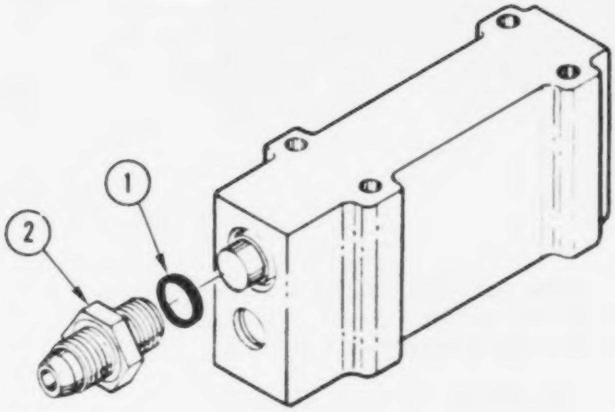
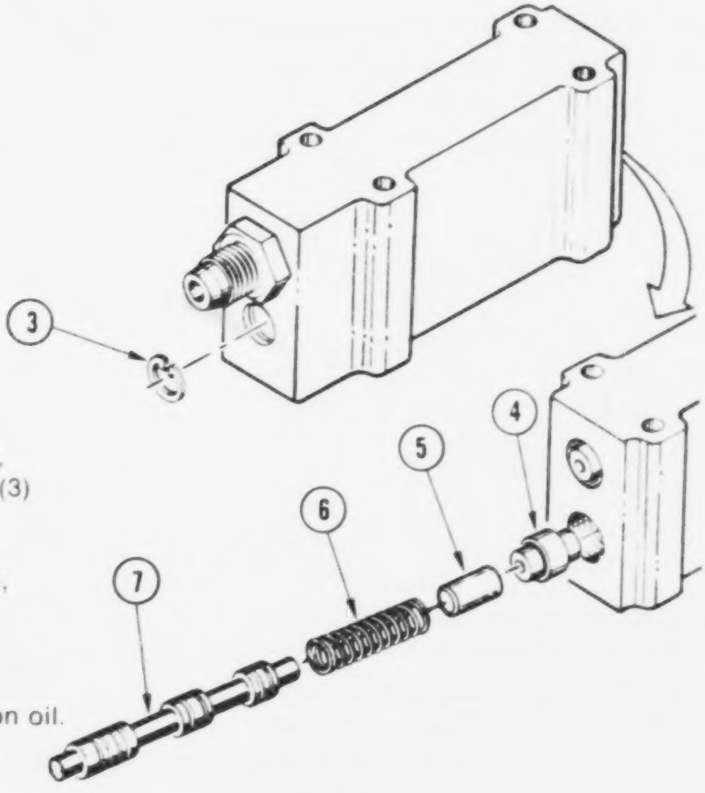


19. COAT NEW PREFORMED PACKING (1) WITH TRANSMISSION OIL. INSTALL PACKING AND ADAPTER (2).

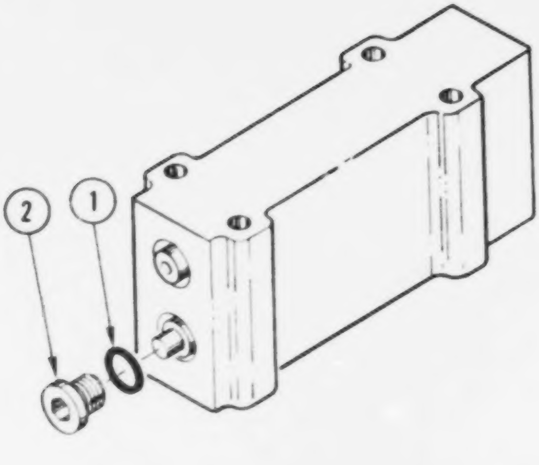
20. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE ADAPTER (2) TO 40-45 ft-lbs (6 mkg).



21. USING RETAINING-RING PLIERS, INSTALL NEW RETAINING RING (3) WITH SHARP SIDE OUT.

22. INSTALL RETAINER (4), PLUG (5), AND SPRING (6).

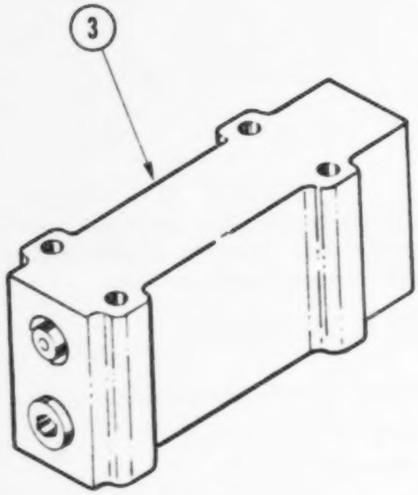
23. INSTALL SLEEVE (7).
    a. Coat sleeve (7) with transmission oil.
    b. Install sleeve (7) with small end toward spring (6).



24. COAT NEW PREFORMED PACKING (1) WITH TRANSMISSION OIL. INSTALL PACKING ON PLUG (2).

25. USING 1/2-INCH DRIVE RATCHET HANDLE WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, INSTALL PLUG (2).

26. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (2) TO 16-20 ft-lbs (2-3 mkg).



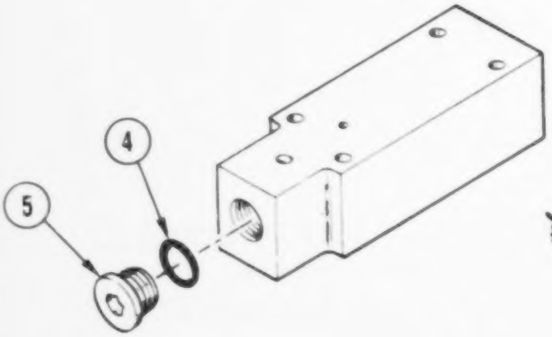
27. REMOVE VALVE ASSEMBLY (3) FROM VISE.

28. EFFORT IS COMPLETE. GO TO END OF TASK.

29. COAT NEW PREFORMED PACKING (4) WITH TRANSMISSION OIL. INSTALL PACKING ON PLUG (5).

30. USING 1/2-INCH DRIVE RATCHET HANDLE WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, INSTALL PLUG (5).

31. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (5) TO 16-20 ft-lbs (2-3 mkg).



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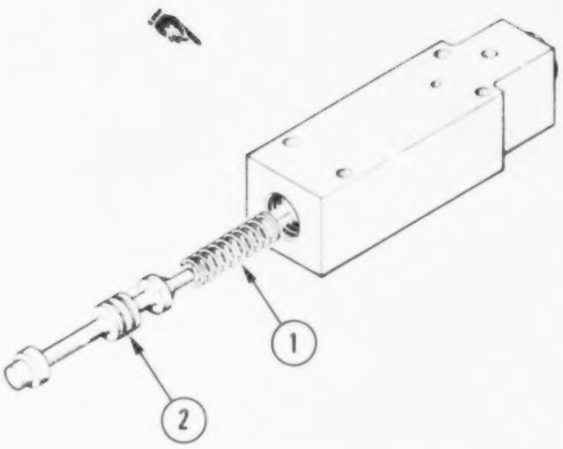
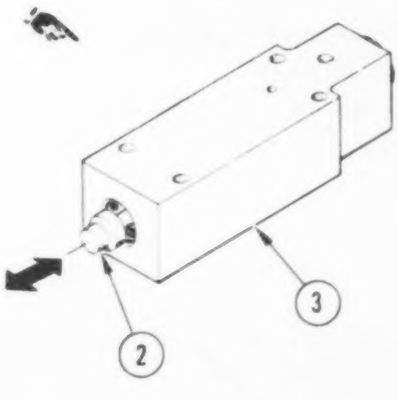


CAUTION

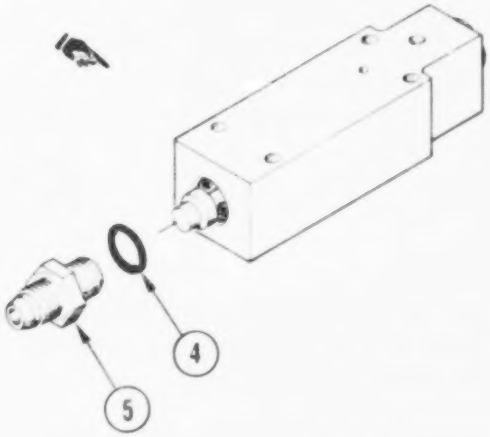
Valve assembly moving parts are precision fit. Do not drop, scratch, or nick any parts. Damage to equipment can occur.

32. INSTALL SPRING (1).

33. INSTALL SLIDE (2).
    a. Coat slide (2) with transmission oil.
    b. Install slide (2) with small diameter end toward spring (1).

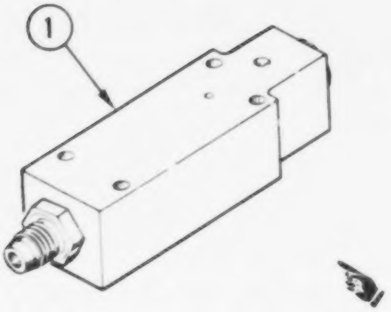


34. CHECK THAT SLIDE (2) MOVES FREELY IN HOUSING (3).
    a. Push in and release slide (2) several times.
    b. If slide (2) moves freely in housing (3), go to step 35. If not, go to step 14.2.



35. COAT NEW PREFORMED PACKING (4) WITH TRANSMISSION OIL. INSTALL PACKING AND ADAPTER (5).

36. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE ADAPTER (5) TO 40-45 ft-lbs (6 mkg).



37. REMOVE VALVE ASSEMBLY (1) FROM VISE.

END OF TASK

Section XXIII. SECOND RANGE RELAY VALVE ASSEMBLY

TASK INDEX

Task	Page
Replace Second Range Relay Valve Assembly	4-514
Repair Second Range Relay Valve Assembly	4-521

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPLACE SECOND RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Remove (page 4-514). Install (page 4-517).

INITIAL SETUP

Tools:

- Crowfoot attachment — (Item 20, App C)
- General mechanic's tool kit: automotive — (Item 33, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 82, App C)
- Socket wrench set — (Item 89, App C)
- Torque wrench — (Item 99, App C)
- Torque wrench — (Item 100, App C)
- Wire-twister pliers — (Item 107, App C)

Materials/Parts:

- Lockwire—(Item 5, App B)
- Transmission oil—(Item 12, App B)
- Preformed packing (4)
- Preformed packing

Personnel Required:

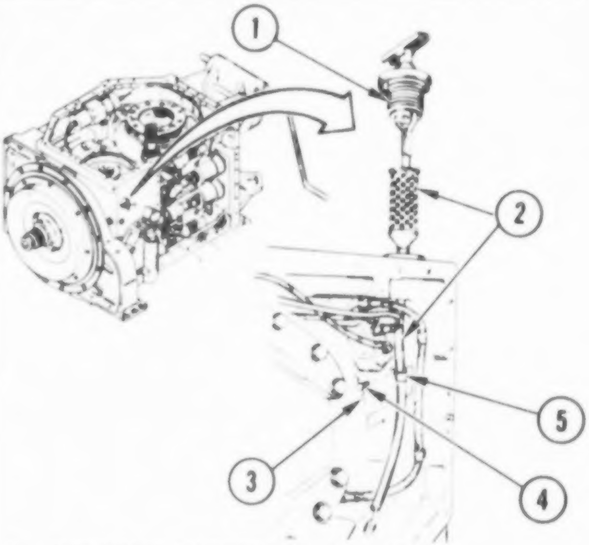
Track Veh Rep 63H10

Equipment Conditions:

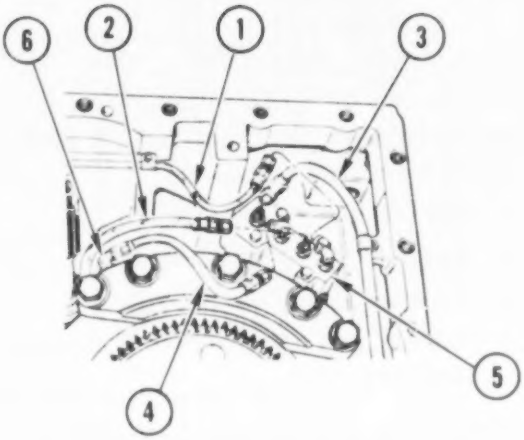
Transmission mounted on tip-over stand. See page 2-144.

REMOVE

1. REMOVE CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.
2. REMOVE LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
3. REMOVE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
4. REMOVE POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
5. REMOVE SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.



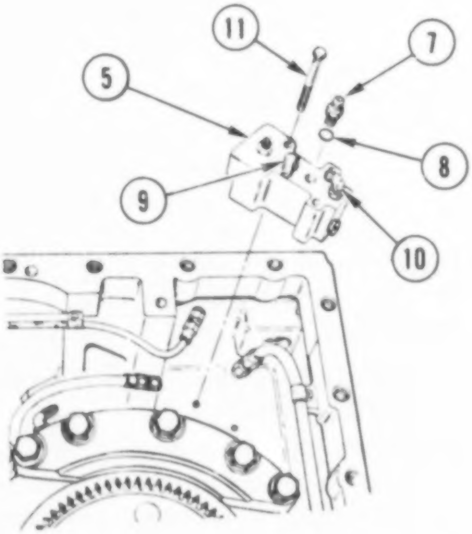
6. REMOVE DIPSTICK (1) AND DIPSTICK TUBE ASSEMBLY (2).
   a. Using wire-twister pliers, remove and discard lockwire (3).
   b. Using 3/8-inch drive ratchet handle and 7/16-inch socket, remove screw (4).
   c. Remove dipstick (1) and dipstick tube assembly (2) with clamp (5).



NOTE
Disconnect hoses in sequence indicated.

7. USING 3/8-INCH DRIVE RATCHET HANDLE, EXTENSION, AND 9/16-INCH CROWFOOT, DISCONNECT HOSE ASSEMBLIES (1), (2), (3), AND (4) FROM SECOND RANGE RELAY VALVE ASSEMBLY (5).

8. REMOVE HOSE ASSEMBLY (4).
   a. Using 3/8-inch drive ratchet handle, extension, and 9/16-inch crowfoot, disconnect hose assembly (4) from hose to boss elbow (6).
   b. Remove hose assembly (4).



9. REMOVE SECOND RANGE RELAY VALVE ASSEMBLY (5).
   a. Using 3/8-inch drive ratchet handle, extension, and 9/16-inch crowfoot, remove adapter (7).
   b. Remove and discard preformed packing (8) from adapter (7).
   c. Loosen and turn 90-degree elbow (9) and 45-degree elbow (10) clear of mounting screws.
   d. Using 3/8-inch drive ratchet handle, extension, and 7/16-inch socket, remove four screws (11).
   e. Remove relay valve assembly (5).

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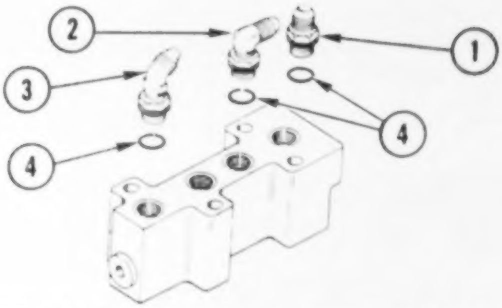
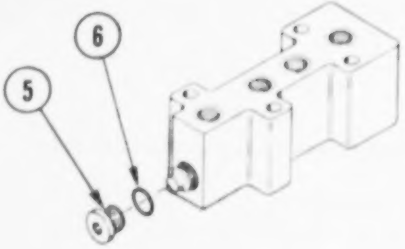
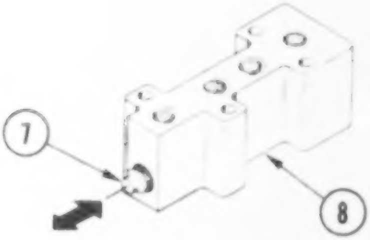


10. REMOVE SECOND ADAPTER (1) AND ELBOWS (2), AND (3).
    a. Remove second adapter (1).
    b. Remove 90-degree elbow (2).
    c. Remove 45-degree elbow (3).
    d. Remove and discard three preformed packings (4).

11. INSPECT MAIN HOUSING INSERTS.
    a. Inspect inserts. See page 2-5.
    b. Repair inserts if damaged. See task REPAIR MAIN HOUSING INSERTS, page 4-150.



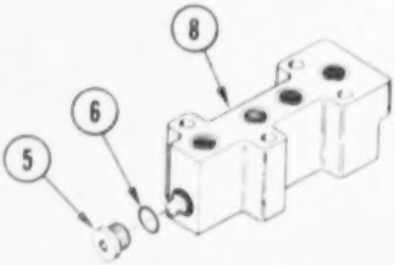
12. REMOVE PLUG (5).
    a. Using 3/8-inch drive ratchet handle and 1/4-inch socket wrench attachment, remove plug (5) and preformed packing (6). Discard packing.



13. CHECK THAT DIRECTIONAL CONTROL SLIDE (7) MOVES FREELY IN HOUSING (8).
    a. Push slide (7) in and out of housing (8) several times.
    b. If slide (7) does not move freely in housing (8), go to step 14. If slide does move freely in housing, go to step 16.

14. REPAIR SECOND RANGE RELAY VALVE ASSEMBLY, page 4-521.

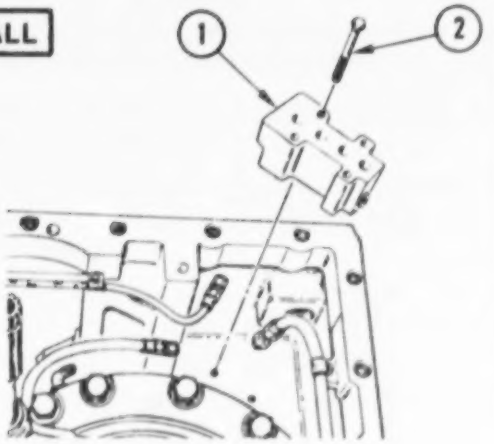
15. GO TO STEP 18.



16. INSTALL PLUG (5) IN HOUSING (8).
    a. Coat new preformed packing (6) with transmission oil. Install on plug (5).
    b. Using 3/8 inch drive ratchet handle and 1/4-inch socket wrench attachment, install plug (5).

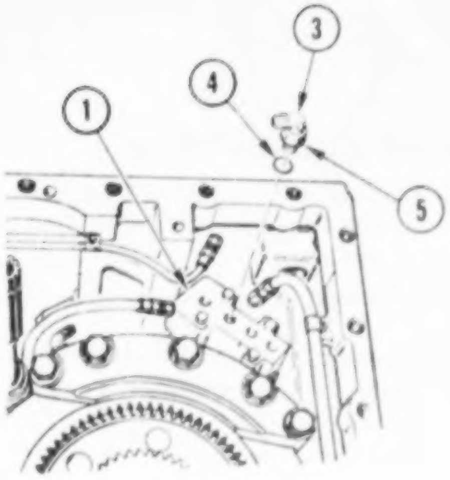
17. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (5) TO 20-25 ft-lb (3 mkg).

INSTALL



18. INSTALL SECOND RANGE RELAY VALVE HOUSING (1).
    a. Using 3/8-inch drive ratchet handle, extension, and 7/16-inch socket, install four screws (2).

19. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 7/16-INCH SOCKET, TORQUE FOUR SCREWS (2) TO 120-145 in-lb (138-167 cmkg).



20. INSTALL 90-DEGREE ELBOW (3).
    a. Coat new preformed packing (4) with transmission oil. Install packing on elbow (3).
    b. Screw elbow (3) into housing (1). Hand tighten until captive washer (5) makes firm contact with housing.

CAUTION

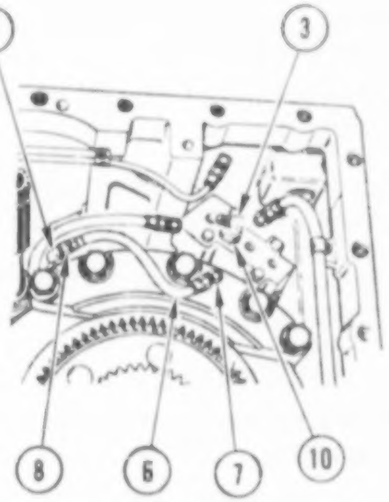
Do not allow hoses to contact moving parts. Equipment can be damaged.

Do not allow hoses to twist. Hose fixtures must be held while torquing hose nuts. Equipment can be damaged.

21. INSTALL HOSE ASSEMBLY (6).
    a. Connect hose nut (7) to elbow (3).
    b. Connect hose nut (8) to elbow (9).

22. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (10) TO 125-135 in-lb (144-155 cmkg).

23. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE HOSE NUTS (7) AND (8) TO 125-135 in-lb (144-155 cmkg).



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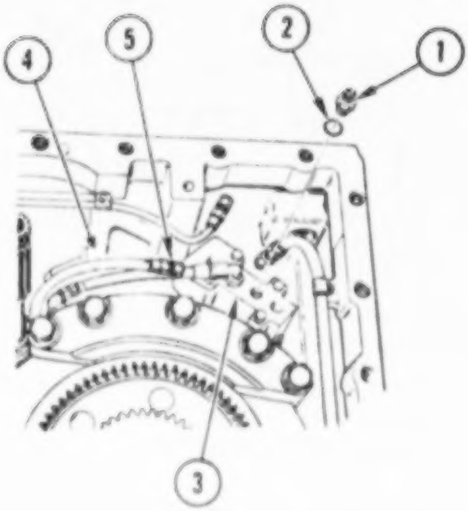
24. INSTALL ADAPTER (1).
    a. Coat new preformed packing (2) with transmission oil. Install packing on adapter (1).
    b. Install adapter (1) in valve housing (3).

25. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE ADAPTER (1) TO 125-135 in-lb (144-155 cmkg).

26. INSTALL HOSE ASSEMBLY (4).
    a. Connect hose nut (5) to adapter (1).

27. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (5) TO 125-135 in-lb (144-155 cmkg).

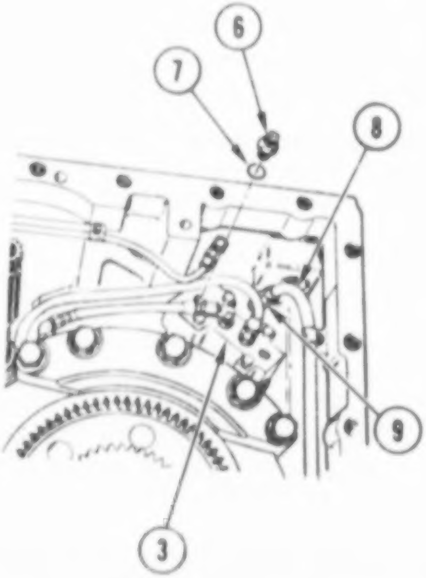


28. INSTALL SECOND ADAPTER (6).
    a. Coat new preformed packing (7) with transmission oil. Install packing on second adapter (6).
    b. Install second adapter (6) in valve housing (3).

29. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE SECOND ADAPTER (6) TO 125-135 in-lb (144-155 cmkg).

30. INSTALL HOSE ASSEMBLY (8).
    a. Connect hose nut (9) to second adapter (6).

31. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE HOSE NUT (9) TO 125-135 in-lb (144-155 cmkg).

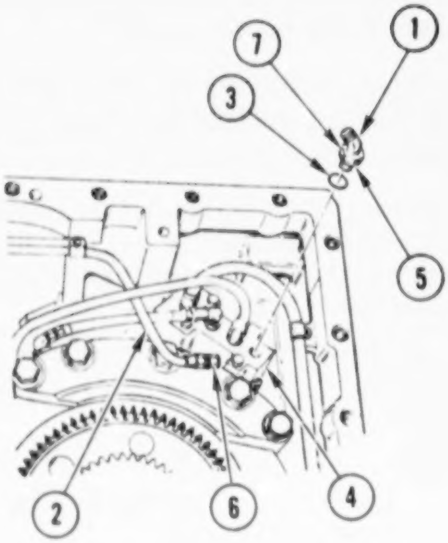


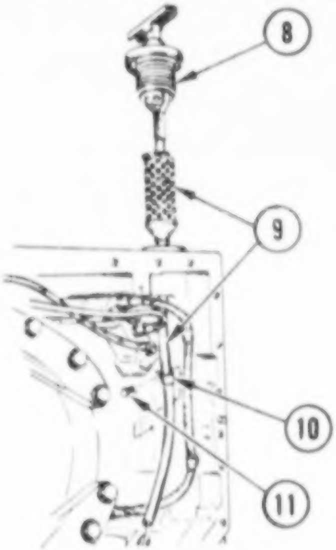
CAUTION

Do not allow hoses to contact each other when installing. Equipment can be damaged.

32. INSTALL 45-DEGREE ELBOW (1) AND HOSE ASSEMBLY (2).
    a. Coat new preformed packing (3) with transmission oil. Install packing on elbow (1).
    b. Screw elbow (1) into housing (4). Hand tighten until captive washer (5) makes firm contact with housing.
    c. Connect hose nut (6) to elbow (1).

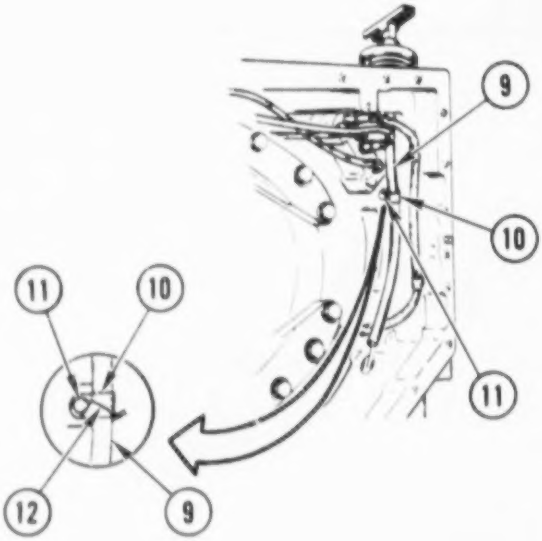
33. USING 3/8-INCH DRIVE TORQUE WRENCH, EXTENSION, AND 9/16-INCH CROWFOOT, TORQUE LOCKNUT (7) AND HOSE NUT (6) TO 125-135 in-lb (144-155 cmkg).





34. INSTALL DIPSTICK (8) AND DIPSTICK TUBE ASSEMBLY (9).
    a. Install dipstick (8) and tube assembly (9).
    b. Install clamp (10) and screw (11).

35. USING 3/8-INCH DRIVE TORQUE WRENCH AND 7/16-INCH SOCKET, TORQUE SCREW (11) TO 110-120 in-lb (127-138 cmkg).



36. INSTALL NEW LOCKWIRE (12).
    a. Using wire-twister pliers, install lockwire (12) through screw (11) and around tube (9) and clamp (10).

GO TO NEXT PAGE

37. INSTALL SPUR GEARSHAFT. See task REPLACE SPUR GEARSHAFT, page 4-398.
38. INSTALL POSITIVE CLUTCH. See task REPLACE POSITIVE CLUTCH, page 4-356.
39. INSTALL LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY. See task REPLACE LEFT-HAND INTERMEDIATE HOUSING ASSEMBLY, page 4-220.
40. INSTALL LEFT-HAND OUTPUT HOUSING. See task REPLACE LEFT-HAND OUTPUT HOUSING, page 4-314.
41. INSTALL CONTROLLER ASSEMBLY. See task REPLACE CONTROLLER ASSEMBLY, page 3-32.

END OF TASK

REPAIR SECOND RANGE RELAY VALVE ASSEMBLY

DESCRIPTION

This task covers: Disassemble (page 4-521). Assemble (page 4-523).

INITIAL SETUP

Tools:

- General mechanic's tool kit: automotive — (Item 33, App C)
- Inside/outside indicator caliper — (Item 41, App C)
- Machinist's vise — (Item 47, App C)
- Micrometer caliper set — (Item 52, App C)
- Retaining-ring pliers — (Item 61, App C)
- Small hole gage set — (Item 72, App C)
- Socket wrench adapter — (Item 75, App C)
- Socket wrench attachment — (Item 82, App C)
- Torque wrench — (Item 100, App C)

Materials/Parts:

- Transmission oil — (Item 12, App B)
- Preformed packing
- Retaining ring

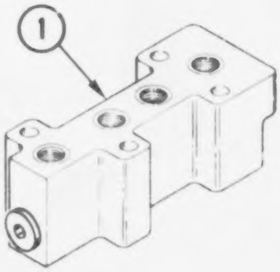
Personnel Required:

Track Veh Rep 63H10

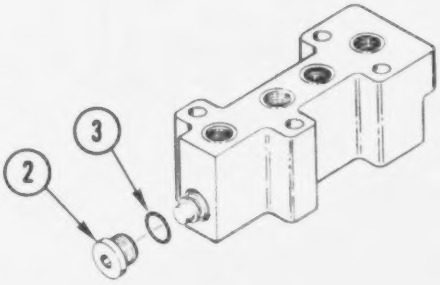
Equipment Conditions:

Second range relay valve assembly on workbench. See page 4-514.

DISASSEMBLE



1. PLACE SECOND RANGE RELAY VALVE ASSEMBLY (1) IN VISE.



2. REMOVE PLUG (2).
   a. Using 1/2-inch drive ratchet handle with adapter and 1/4-inch socket wrench attachment, remove plug (2) and preformed packing (3). Discard packing.

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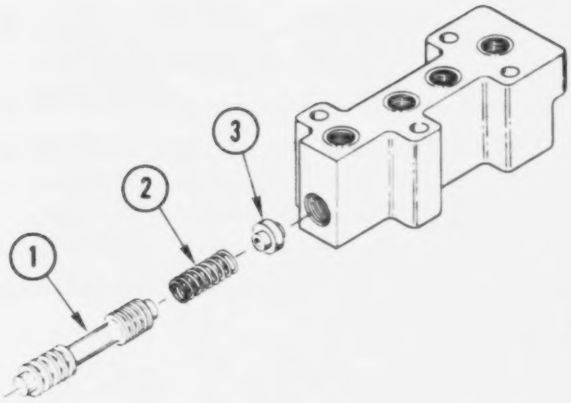
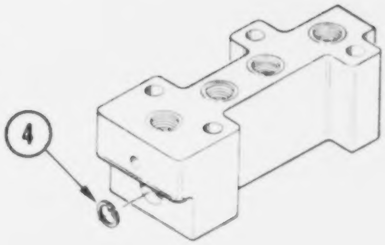


CAUTION

Second range directional control slide and slide bore in valve are precision fit parts. Do not drop, scratch, or nick slide. Equipment can be damaged.

3. REMOVE DIRECTIONAL CONTROL SLIDE (1), SPRING (2), AND RETAINER (3).



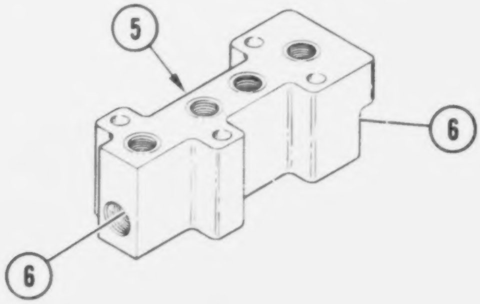
4. USING RETAINING-RING PLIERS, REMOVE AND DISCARD RETAINING RING (4).

5. CLEAN SECOND RANGE RELAY VALVE ASSEMBLY.

   a. Clean housing and piece parts. See page 2-2.

6. INSPECT SECOND RANGE RELAY VALVE ASSEMBLY.

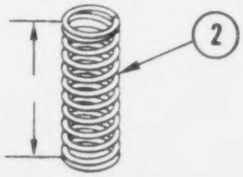
   a. Inspect housing and piece parts. See page 2-5.



7. CHECK HOUSING (5).

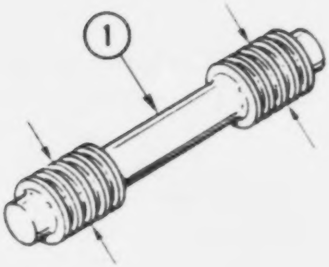
   a. Using small hole gage set and micrometer caliper set, measure diameter of bore (6) in both ends of housing (5). Do not measure threads.

   b. If either measurement is more than 0.5009 inch (12.723 mm), replace valve assembly and go to END OF TASK. If not, go to step 8.



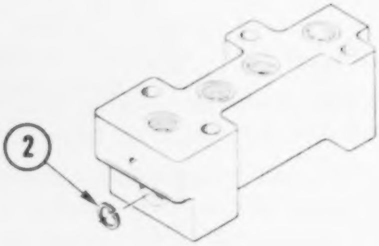
8. CHECK SPRING (2).

   a. Using indicator caliper, measure free length of spring (2). Replace spring if free length is less than 0.90 inch (22.86 mm).

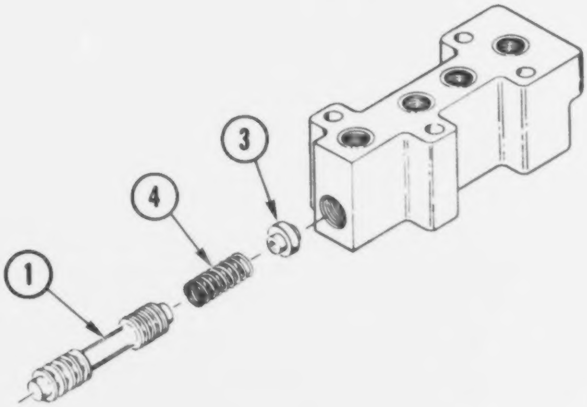


9. CHECK SLIDE (1).
   a. Using micrometer caliper set, measure diameter of slide (1) in two places.
   b. Replace slide (1) if either measurement is less than 0.4992 inch (12.680 mm).

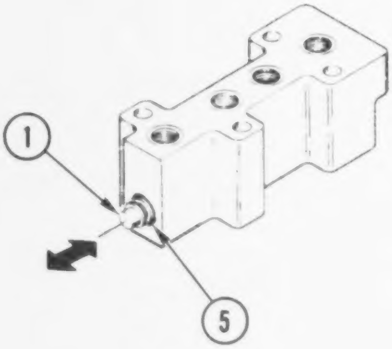
ASSEMBLE



10. USING RETAINING-RING PLIERS, INSTALL NEW RETAINING RING (2) WITH SHARP SIDE OUT.



11. INSTALL RETAINER (3), SPRING (4), AND SLIDE (1).



12. CHECK THAT SLIDE (1) MOVES FREELY IN BORE (5).
    a. Push slide (1) in and out of bore (5) several times.
    b. If slide (1) moves freely in bore (5), go to step 13. If not, go to step 3.

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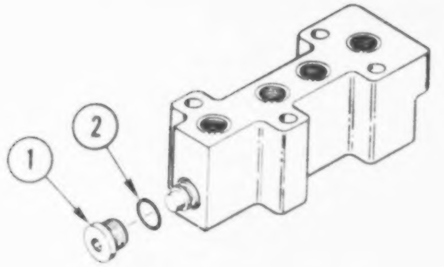
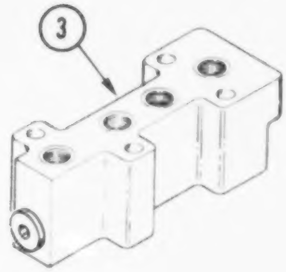


13. INSTALL PLUG (1).
    - a. Coat new preformed packing (2) with transmission oil. Install on plug (1).
    - b. Using 1/2-inch drive ratchet handle with adapter and 1/4-inch socket wrench attachment, install plug (1).

14. USING 1/2-INCH DRIVE TORQUE WRENCH WITH ADAPTER, AND 1/4-INCH SOCKET WRENCH ATTACHMENT, TORQUE PLUG (1) TO 20-25 ft-lb (3 mkg).



15. REMOVE VALVE ASSEMBLY (3) FROM VISE.

END OF TASK

Section XXIV. SHIPPING/STORAGE CONTAINER

TASK INDEX

Task Page
Repair Shipping/Storage Container . . . 4-526

NOTE

REPLACE tasks can also be used to access another part. These tasks are identified by a box around the task title. For more information, see page xv.

REPAIR SHIPPING/STORAGE CONTAINER

DESCRIPTION

This task covers the following subtasks:

Subtask	Page
Repair Transmission Upper Container	4-527
Repair Transmission Lower Container	4-536

It includes:

1. Disassembly of shipping/storage container.
2. Repair of transmission upper container.
3. Repair of transmission lower container.
4. Assembly of shipping/storage container.

INITIAL SETUP

Tools:

Adjustable wrench — (Item 1, App C)
Box wrench — (Item 17, App C)
General mechanic's tool kit: automotive — (Item 33, App C)
Lifting sling — (Item 44, App C)
Portable electric drill — (Item 58, App C)
Socket wrench set — (Item 87, App C)
Spanner wrench (2) — (Item 90, App C)
Torque wrench adapter — (Item 97, App C)
Torque wrench — (Item 100, App C)
Twist-drill set — (Item 106, App C)
Lifting device with lift capability of at least 3000 lbs (1361 kg)

Materials/Parts:

Masking tape — (Item 6, App B)
Plastic bag — (Item 9, App B)
Transmission oil — (Item 12, App B)
Wood block (4) — (Item 4, App D)
Wood block (4) — (Item 5, App D)
Preformed packing

Materials/Parts: (cont.)

Preformed packing
Self-locking nut (36)

Personnel Required:

Track Veh Rep 63H10
Helper (H) (2)

References:

TM 9-237

Equipment Conditions:

Shipping/storage container closed (see note)

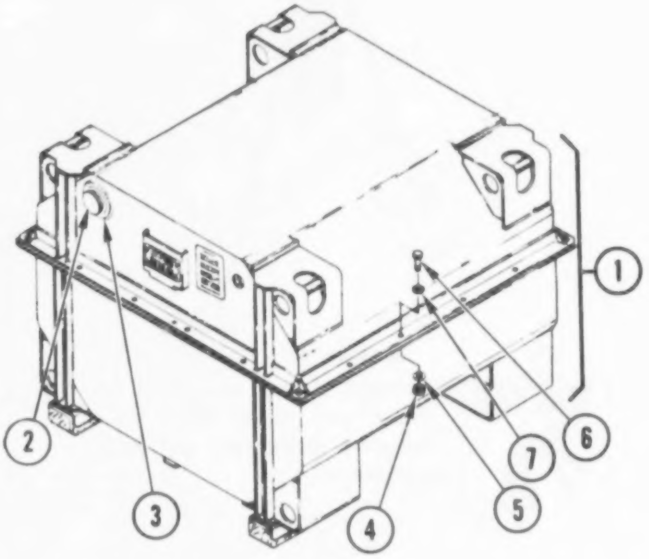
NOTE

Shipping/storage container may be separated into two halves. Front and rear mounts may be removed and placed in lower container.

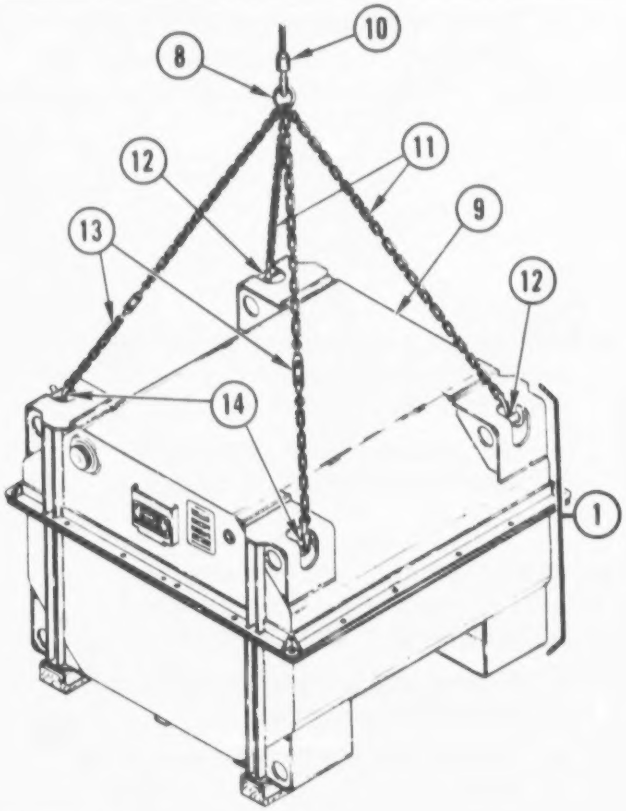
Reusable mounting hardware is in shipping bag and stored in container. All other hardware is put in plastic bag(s) and also stored in container.

REPAIR TRANSMISSION UPPER CONTAINER

DISASSEMBLE



1. RELEASE SHIPPING/STORAGE CONTAINER (1) INTERNAL PRESSURE.
   a. Depress and hold pressure equalizing valve button (2) on access cover (3) to vent internal pressure of container (1).
2. REMOVE 20 SELF-LOCKING NUTS (4), WASHERS (5), SCREWS (6), AND WASHERS (7). DO NOT DISCARD NUTS.



3. REPAIRER AND HELPER ATTACH LIFTING SLING (8) TO UPPER CONTAINER (9) OF SHIPPING/STORAGE CONTAINER (1).
   a. (H) Using lifting device (10), lower sling (8) to reach upper container (9).
   b. Attach two legs (11) of sling (8) to rear lifting points (12).
   c. Attach two turnbuckle legs (13) of sling (8) to front lifting points (14)
   d. (H) Adjust length of two turnbuckle legs (13), if necessary.

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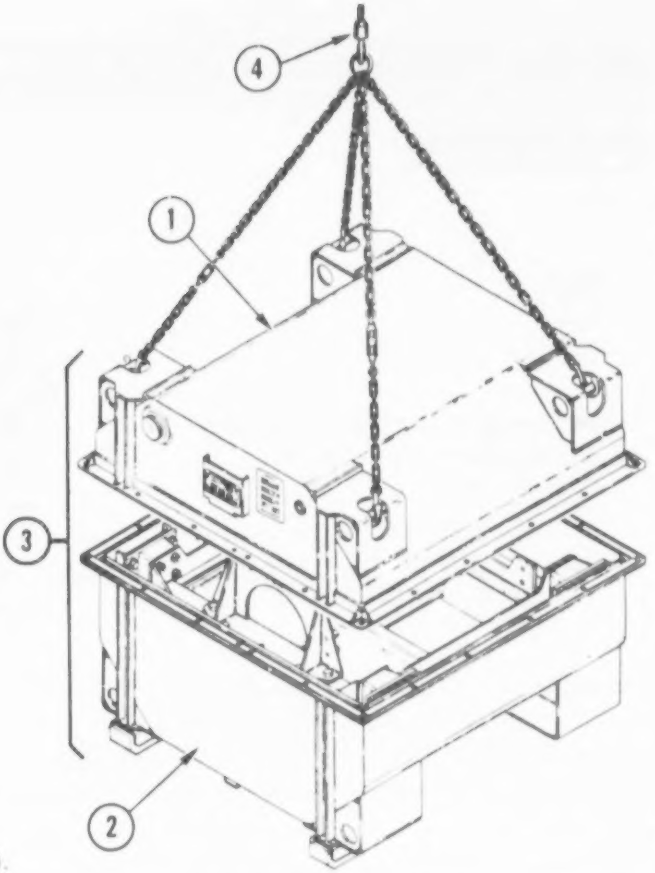
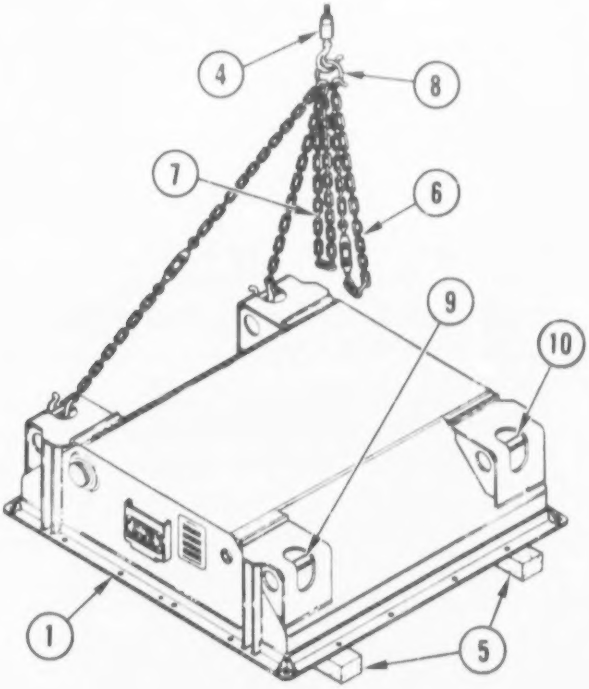


WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

4. REMOVE UPPER CONTAINER (1) FROM LOWER CONTAINER (2) OF SHIPPING/STORAGE CONTAINER (3).
   a. Using lifting device (4), raise upper container (1) from lower container (2).



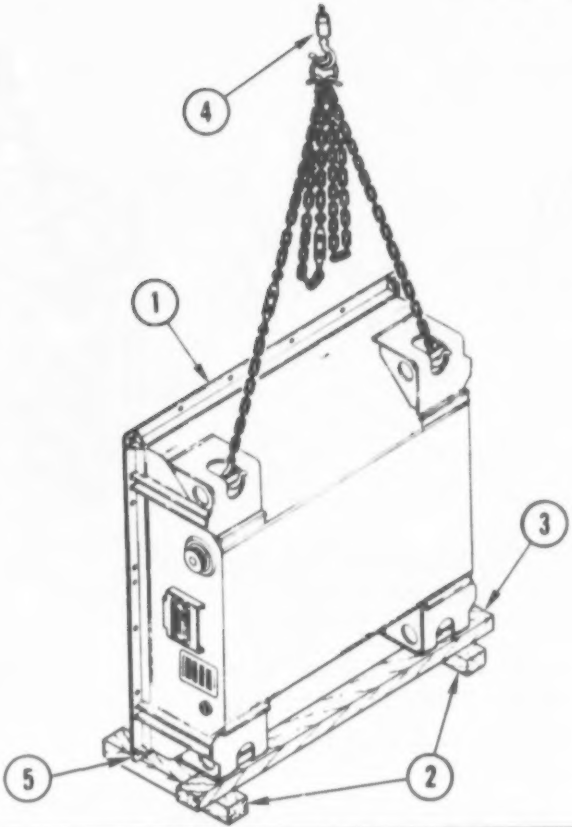
5. REPAIRER AND HELPER POSITION UPPER CONTAINER (1) ON PROTECTIVE BLOCKS (5) (ITEM 5).
   a. Using lifting device (4), position upper container (1) on blocks (5) (Item 5).

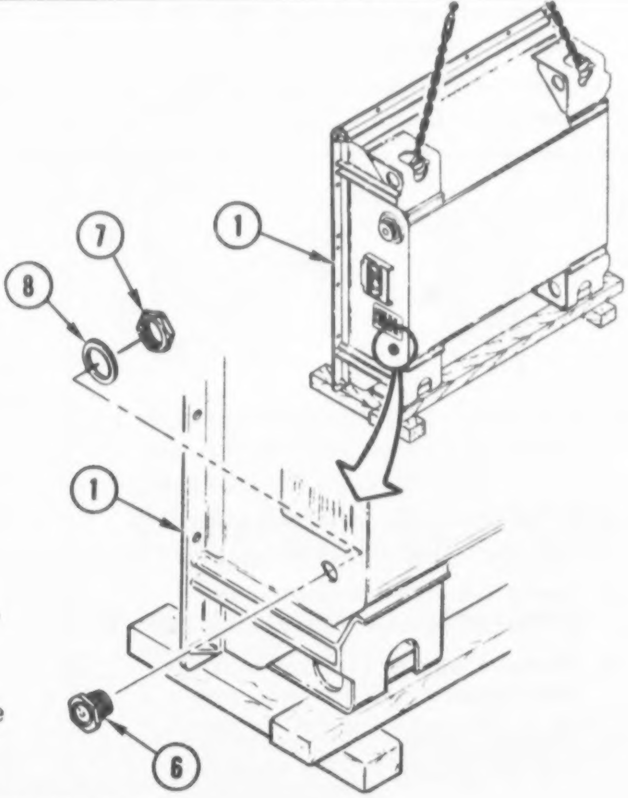
6. REPAIRER AND HELPER REMOVE LEG (6) AND LEG (7) OF SLING (8) FROM UPPER CONTAINER (1).
   a. Remove one turnbuckle leg (6) from front lifting point (9).
   b. Remove one leg (7) from rear lifting point (10).

WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

7. REPAIRER AND HELPERS LIFT UPPER CONTAINER (1) ONTO ONE SIDE AND POSITION ON PROTECTIVE BLOCKS (2) (ITEM 4) AND (3) (ITEM 5).
   a. Using lifting device (4), lift upper container (1).
   b. Lower upper container (1) until lip (5) rests on protective blocks (2) (Item 4) and the upper portion of container rests on block (3) (Item 5).





8. REPAIRER AND HELPER REMOVE HUMIDITY INDICATOR (6) FROM UPPER CONTAINER (1).
   a. (H) Using 15-inch adjustable wrench, hold nut (7) on inside of upper container (1).
   b. Using 1 3/8-inch box wrench, remove humidity indicator (6), nut (7), and washer (8) from upper container (1).

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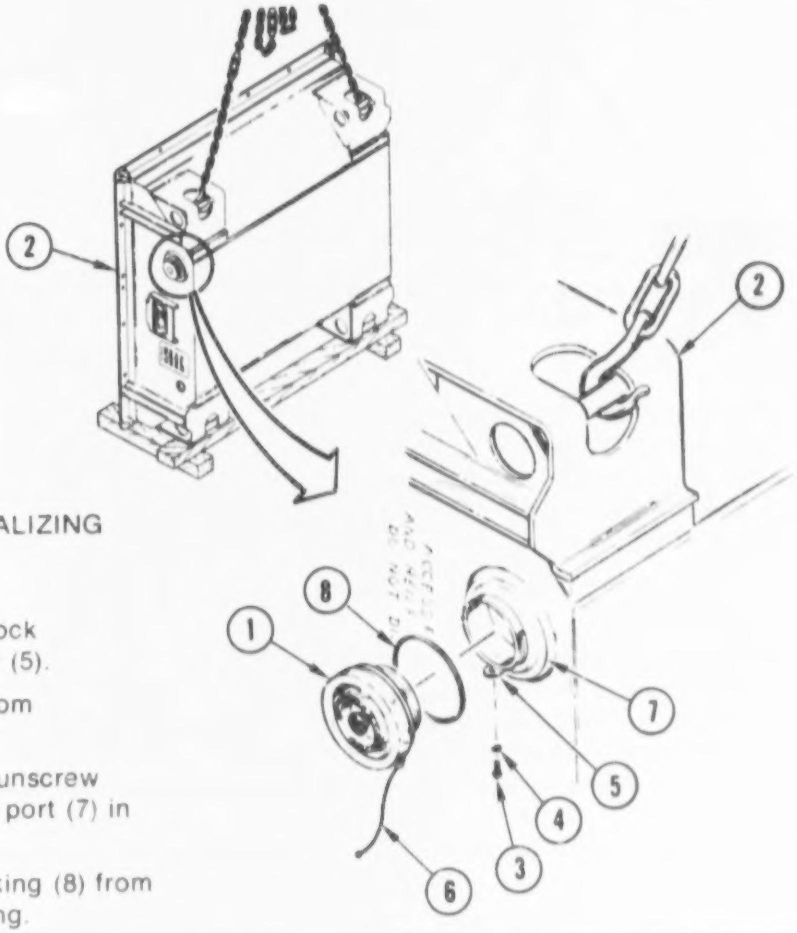
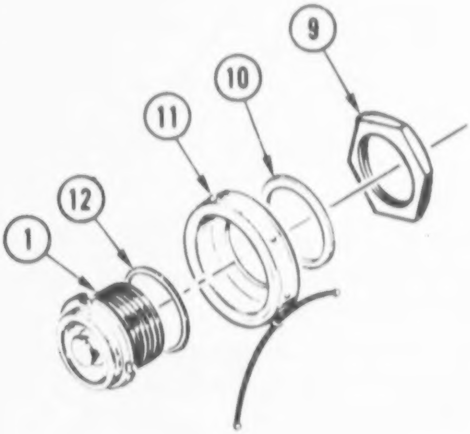
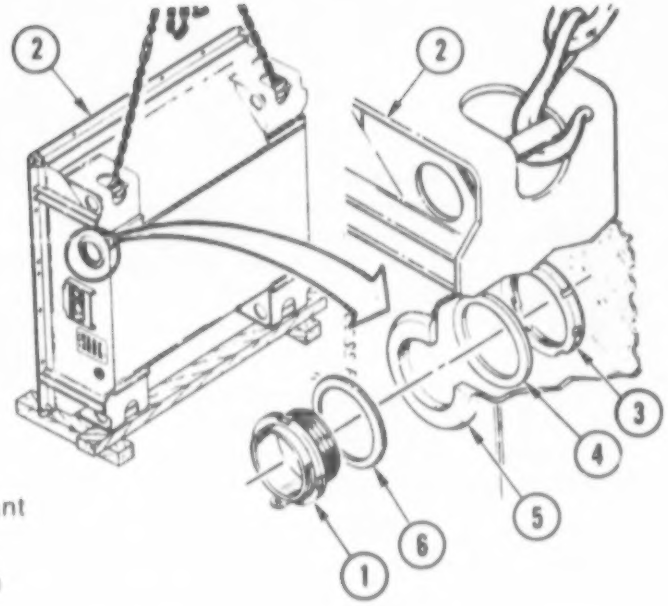


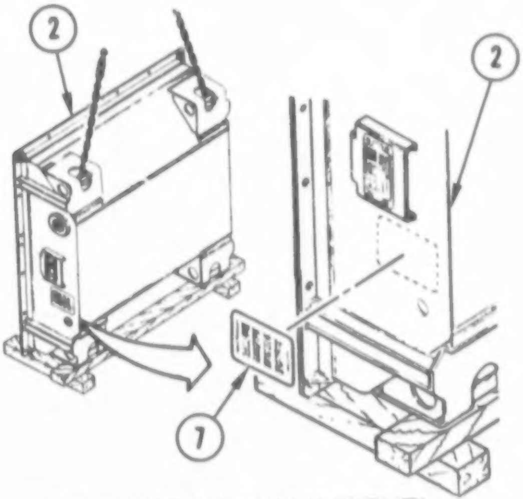
9. REMOVE PRESSURE EQUALIZING VALVE (1) FROM UPPER CONTAINER (2).
   1. Remove screw (3) and lock washer (4) from retainer (5).
   2. Remove wire rope (6) from retainer (5).
   3. Using spanner wrench, unscrew valve (1) from dessicant port (7) in upper container (2).
   4. Remove preformed packing (8) from valve (1). Discard packing.



10. REMOVE NUT (9), WASHER (10), AND VALVE (1) FROM ACCESS COVER (11).
    1. Using 1-inch drive ratchet and 2 1/4-inch socket, remove nut (9).
    2. Remove washer (10) and valve (1) from cover (11).
    3. Remove gasket (12) from cover (11). Discard gasket (12), if damaged.

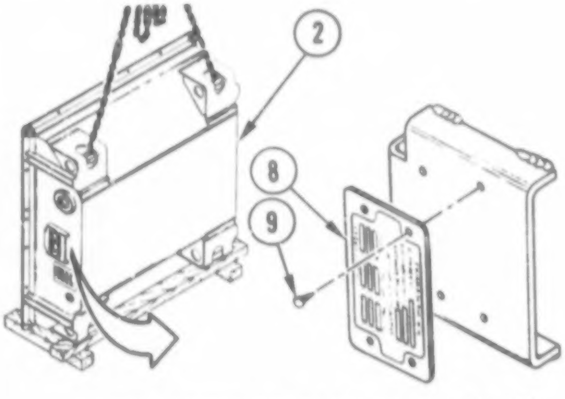


11. REPAIRER AND HELPER REMOVE COLLAR (1) FROM UPPER CONTAINER (2)
    a. (H) Using spanner wrench, hold nut (3) on inside of upper container (2).
    b. Using second spanner wrench, remove access cover collar (1), nut (3), and washer (4) from dessicant port (5) on upper container (2).
    c. Remove preformed packing (6) from collar (1). Discard packing.



12. INSPECT INSTALLATION IDENTIFICATION MARKER (7) ON UPPER CONTAINER (2) FOR DAMAGE.
    a. If identification marker (7) is damaged or cannot be read, go to step 13. If not, go to step 14.

13. REMOVE IDENTIFICATION MARKER (7) FROM UPPER CONTAINER (2).



14. INSPECT IDENTIFICATION PLATE (8) ON UPPER CONTAINER (2) FOR DAMAGE OR LOOSENESS.
    a. If plate (8) is loose or damaged, go to step 15. If not, go to step 16.

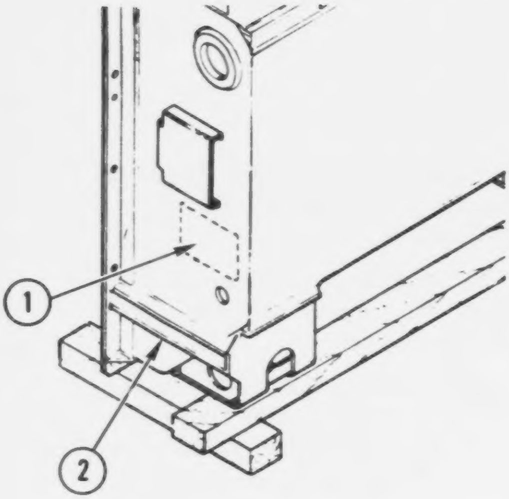
15. REMOVE PLATE (8) FROM UPPER CONTAINER (2).
    a. Using electric drill and drill set, remove four drive screws (9) and plate (8) from upper container (2). Discard screws.

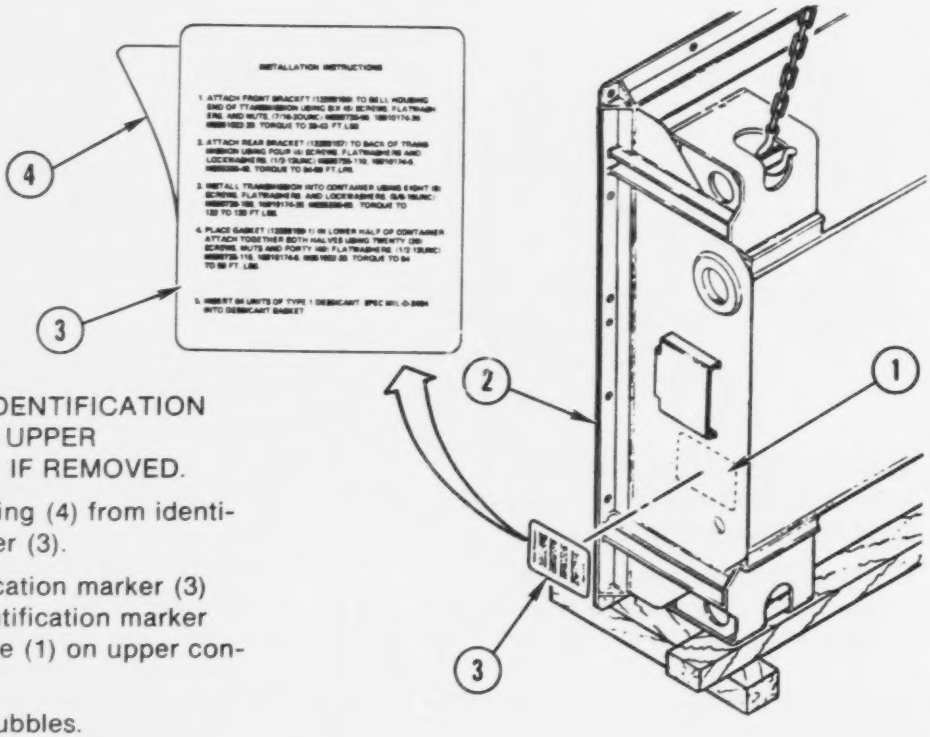
GO TO NEXT PAGE

ASSEMBLE

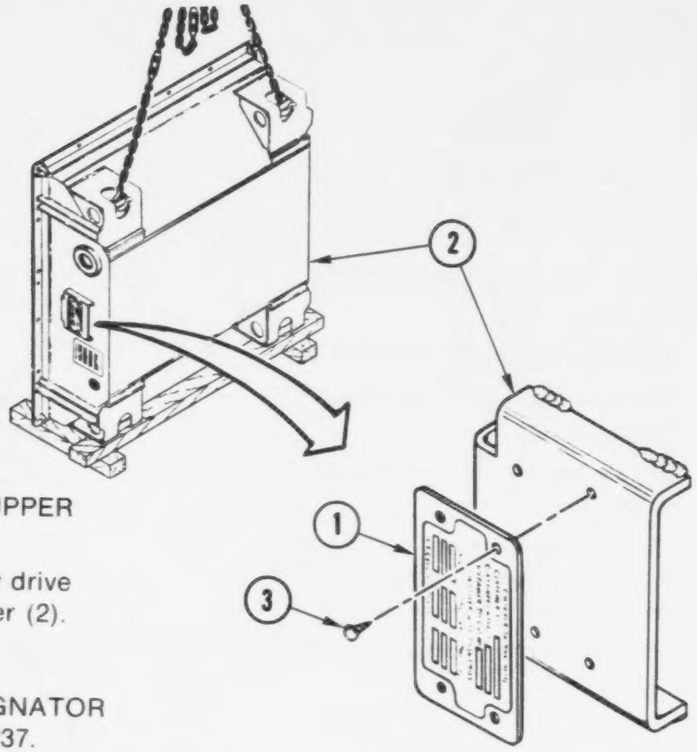
WARNING
Solvent fumes can burn and could poison you. Read warning in the front of this manual.

16. CLEAN IDENTIFICATION MARKER MATING SURFACE (1) ON UPPER CONTAINER (2) IF IDENTIFICATION MARKER WAS REMOVED.
    a. Use wiping rag dampened with cleaning solvent.
    b. Dry identification marker mating surface (1) with dry wiping rag.

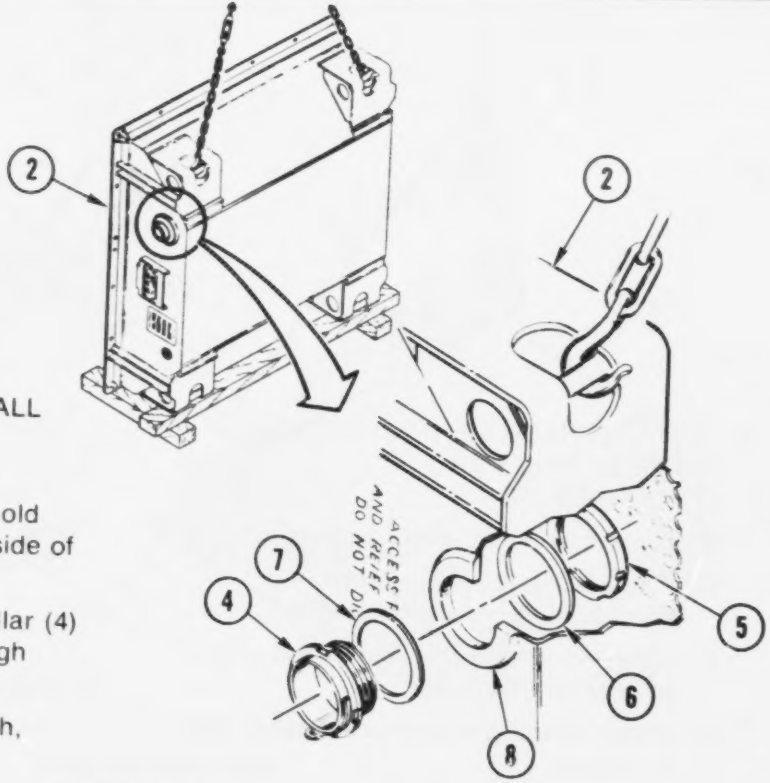




17. INSTALL NEW IDENTIFICATION MARKER (3) ON UPPER CONTAINER (2), IF REMOVED.
    a. Remove backing (4) from identification marker (3).
    b. Press identification marker (3) firmly on identification marker mating surface (1) on upper container (2).
    c. Rub out air bubbles.



18. INSTALL NEW PLATE (1) ON UPPER CONTAINER (2) IF REMOVED.
    a. Install plate (1) and four new drive screws (3) on upper container (2).
19. WELD UPPER CONTAINER (2) AS NECESSARY. METAL DESIGNATOR IS MIL-S-1261, CLASS I. TM 9-237.



20. REPAIRER AND HELPER INSTALL COLLAR (4) ON UPPER CONTAINER (2).
    a. (H) Using spanner wrench, hold nut (5) and washer (6) on inside of upper container (2).
    b. Place new packing (7) on collar (4) and thread into nut (5) through dessicant port (8).
    c. Using second spanner wrench, tighten collar (4).

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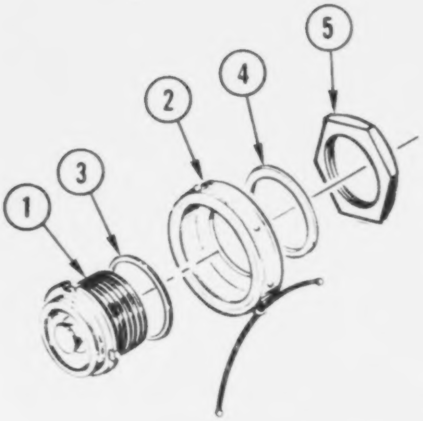
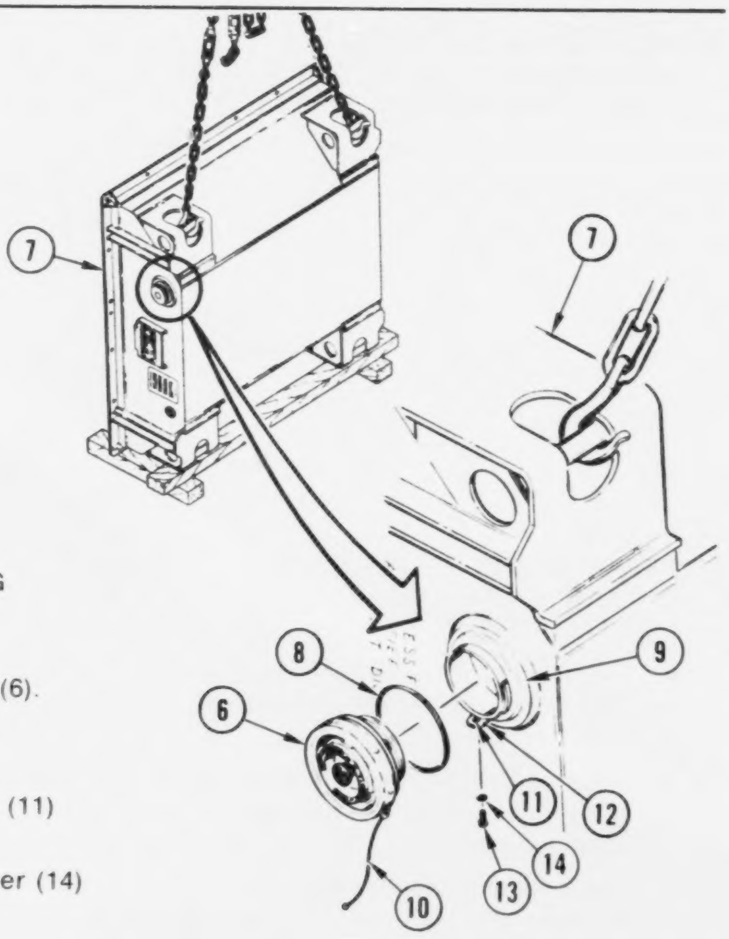
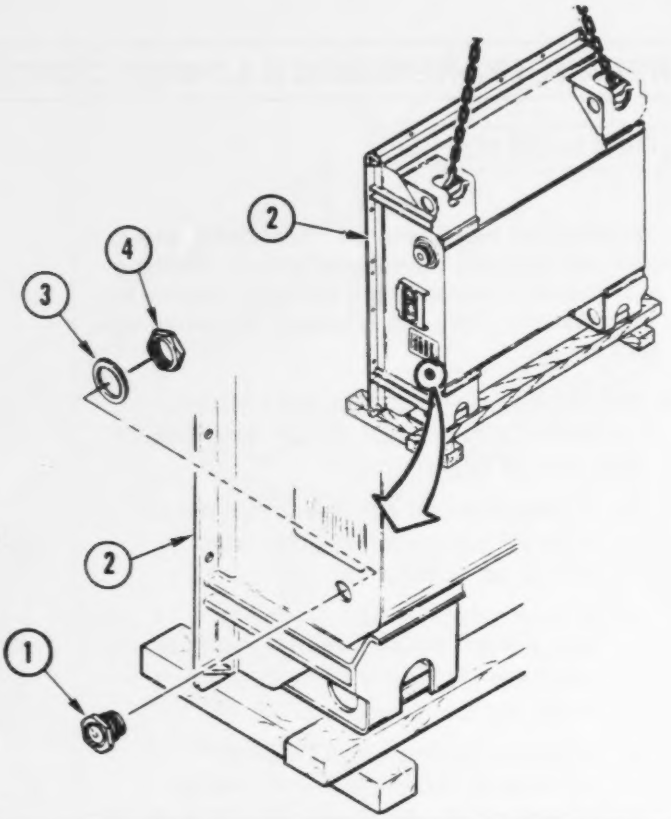


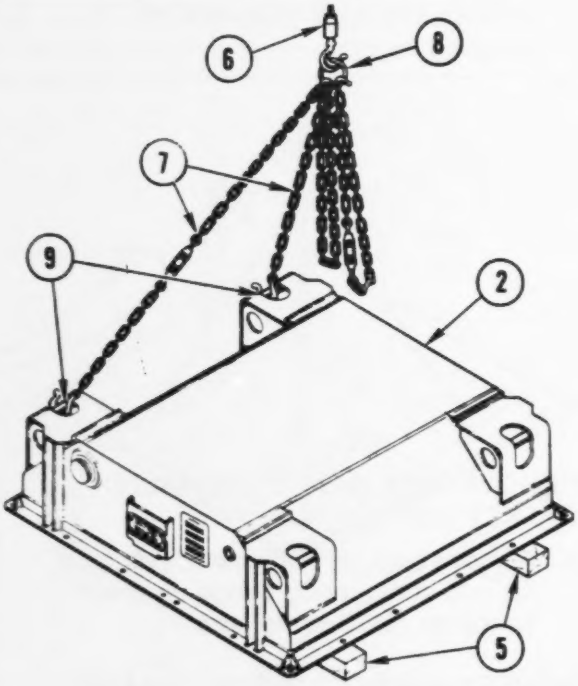
21. INSTALL VALVE (1) IN ACCESS COVER (2).
    a. Position gasket (3) on valve (1).
    b. Position valve (1) in access cover (2).
    c. Install washer (4) and nut (5) on valve (1).
    d. Using 1-inch ratchet handle and 2 1/4-inch socket, tighten nut (5) on valve (1).



22. INSTALL PRESSURE EQUALIZING VALVE (6) IN UPPER CONTAINER (7).
    a. Place new packing (8) on valve (6).
    b. Install valve (6) in dessicant port (9) of upper container (7).
    c. Install wire rope (10) into eyelet (11) of retainer (12).
    d. Install screw (13) and lock washer (14) in retainer (12).



23. REPAIRER AND HELPER INSTALL HUMIDITY INDICATOR (1) IN UPPER CONTAINER (2).
    a. Insert humidity indicator (1) through upper container (2).
    b. Install washer (3) and nut (4) on indicator (1).
    c. Using 15-inch adjustable wrench, hold nut (4).
    d. Using 1 3/8-inch box wrench, tighten humidity indicator (1).



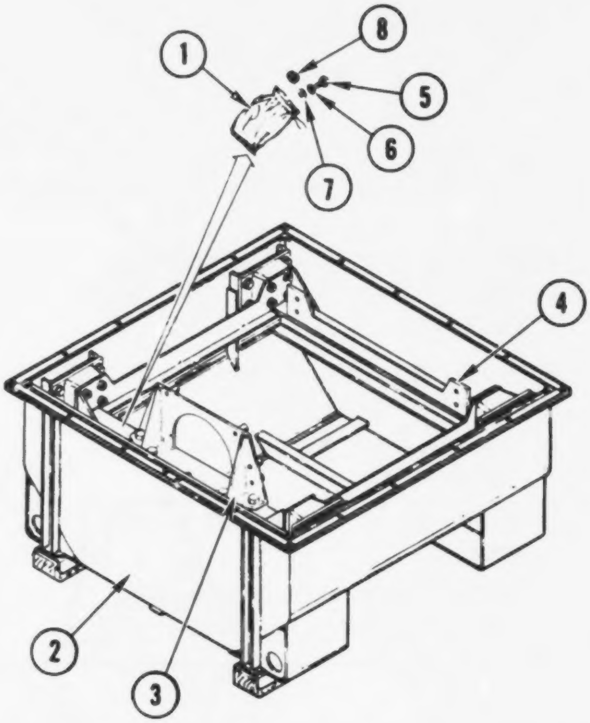
WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

24. REPAIRER AND HELPER POSITION UPPER CONTAINER (2) OPEN SIDE DOWN ON WOOD BLOCKS (5).
    a. (H) Using lifting device (6), position upper container (2) on blocks (5).
25. REMOVE REMAINING TWO LEGS (7) OF SLING (8) FROM LIFTING POINTS (9) OF UPPER CONTAINER (2).

END OF SUBTASK

REPAIR TRANSMISSION LOWER CONTAINER

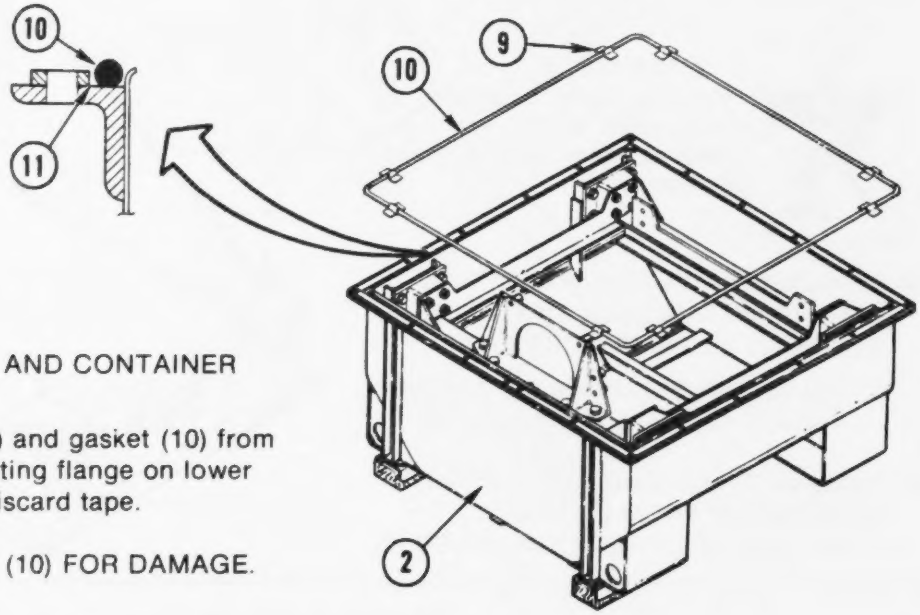
DISASSEMBLE



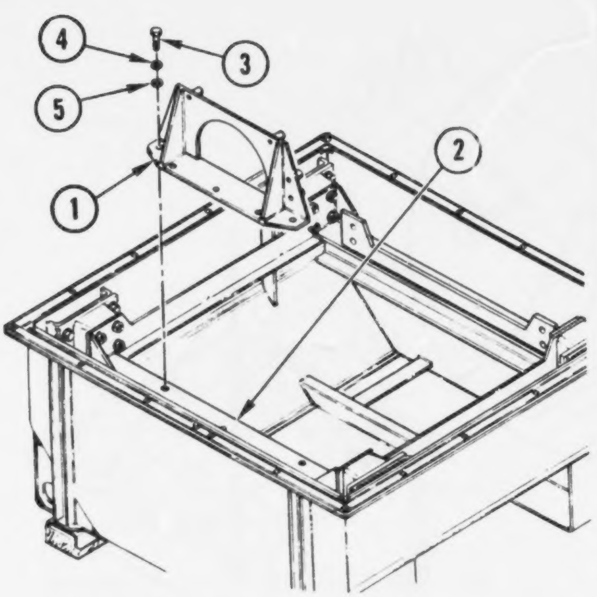
NOTE

The shipping bag contains screws, flat washers, lock washers, and self-locking nuts for installing rear and front transmission container mounts to transmission. They are provided in container for later use.

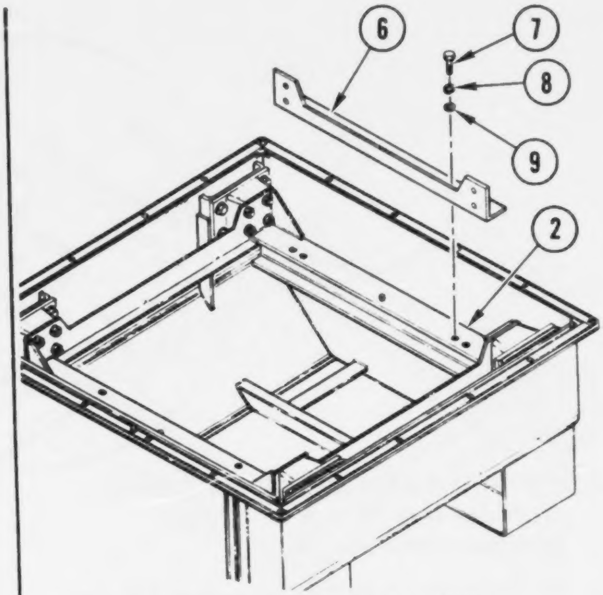
1. REMOVE SHIPPING BAG (1) FROM LOWER CONTAINER (2) OF SHIPPING/ STORAGE CONTAINER.
   a. If transmission container mounts (3) and (4) are installed, go to step 1c. If not, go to step 1b.
   b. Check shipping bag (1) for 18 screws (5), 24 washers (6), 12 lock washers (7), and 6 self-locking nuts (8). Go to step 1d.
   c. Check shipping bag (1) for 10 screws (5), 16 washers (6), 4 lock washers (7), and 6 self-locking nuts (8).
   d. Replace any parts missing from shipping bag (1).



2. REMOVE TAPE (9) AND CONTAINER GASKET (10).
   a. Remove tape (9) and gasket (10) from lip (11) of mounting flange on lower container (2). Discard tape.
3. INSPECT GASKET (10) FOR DAMAGE. See page 2-5.
   a. Replace gasket (10) if damaged.



4. REMOVE REAR CONTAINER MOUNT (1) FROM TRANSMISSION CONTAINER FRAME (2).
   a. Remove four screws (3), lock washers (4), and flat washers (5) from mount (1). Put in shipping bag.
   b. Remove mount (1) from frame (2).

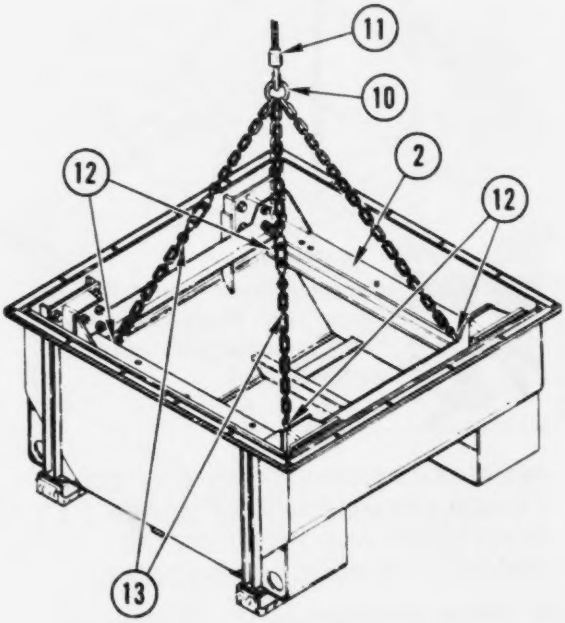


5. REMOVE FRONT CONTAINER MOUNT (6) FROM CONTAINER FRAME (2).
   a. Remove four screws (7), lock washers (8) and flat washers (9) from mount (6). Put in shipping bag.
   b. Remove mount (6) from frame (2).

NOTE

Lifting device and sling keep the container frame suspended when parts are removed.

6. REPAIRER AND HELPER ATTACH SLING (10) TO CONTAINER FRAME (2).
   a. (H) Using lifting device (11), lower sling (10) to reach container frame (2).
   b. Attach each leg of sling (10) to a corner (12) of container frame (2).
   c. (H) Adjust length of turnbuckle legs (13), if necessary.



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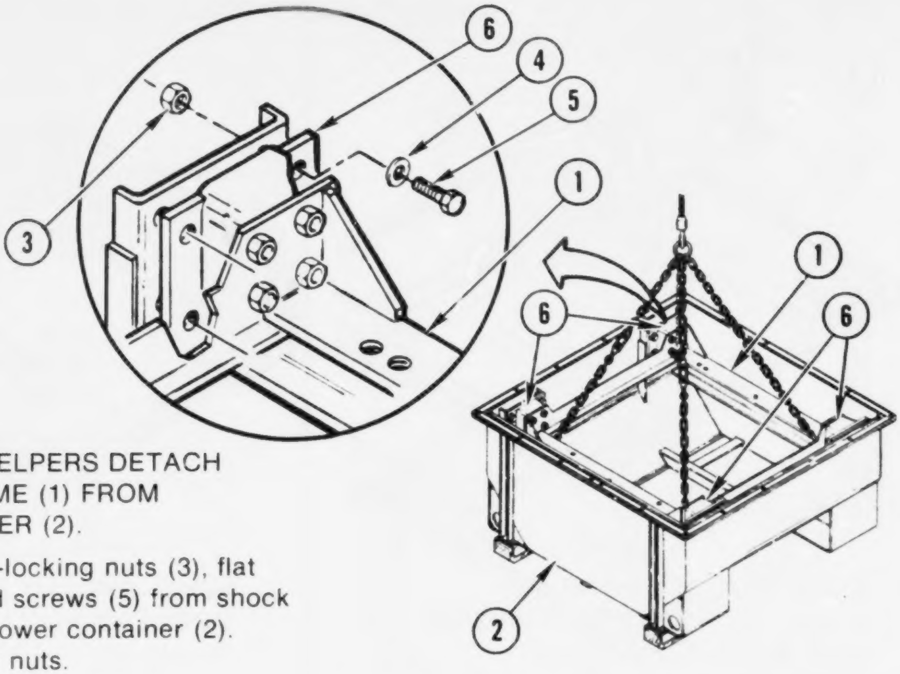
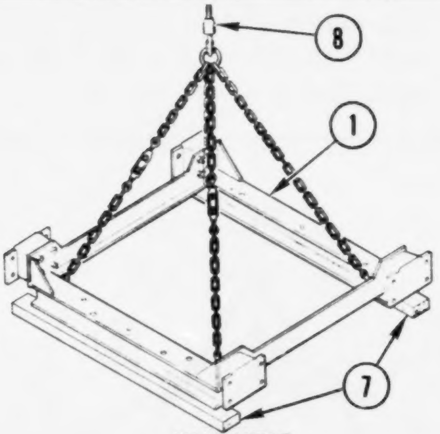


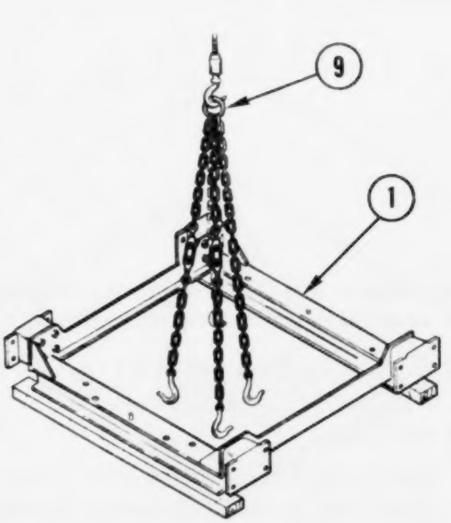
7. REPAIRER AND HELPERS DETACH CONTAINER FRAME (1) FROM LOWER CONTAINER (2).
   a. Remove 16 self-locking nuts (3), flat washers (4) and screws (5) from shock mounts (6) on lower container (2). Discard locking nuts.



WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

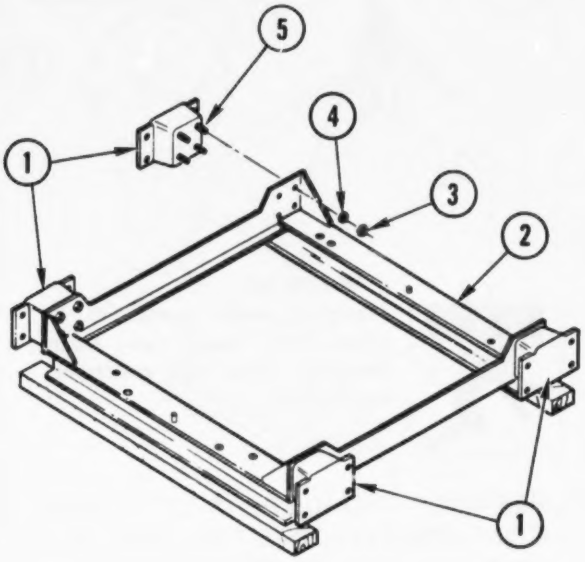
8. REPAIRER AND HELPERS, LIFT CONTAINER FRAME (1) FROM LOWER CONTAINER AND POSITION ON PROTECTIVE BLOCKS (7) (ITEM 5).
   a. Using lifting device (8), position container frame (1) on blocks (7) (Item 5).



9. REPAIRER AND HELPER REMOVE SLING (9) FROM CONTAINER FRAME (1).

10. REMOVE FOUR MOUNTS (1) FROM CONTAINER FRAME (2).
    a. Remove 16 self-locking nuts (3), flat washers (4) and 4 mounts (1) from container frame (2). Discard self-locking nuts.

11. INSPECT FOUR MOUNTS (1) FOR LOOSE BOLTS, CRACKS, TEARS, OR OTHER SIGNS OF DAMAGE. INSPECT MOUNT BOLTS (5) FOR THREAD DAMAGE. See page 2-5.
    a. Replace mounts (1) if damaged.



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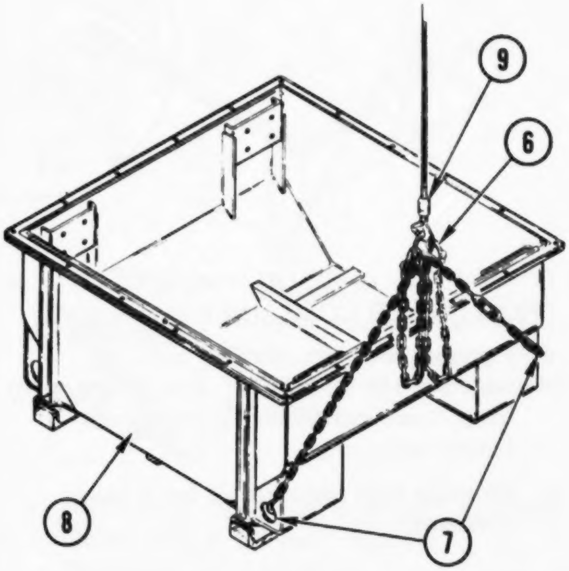
12. REPAIRER AND HELPER ATTACH SLING (6) TO TWO LOWER CORNERS (7) OF LOWER CONTAINER (8).
    a. (H) Using lifting device (9), lower sling (6) to reach lower corners (7) of lower container (8).
    b. Attach two legs of sling (6) to two lower corners (7) of lower container (8).



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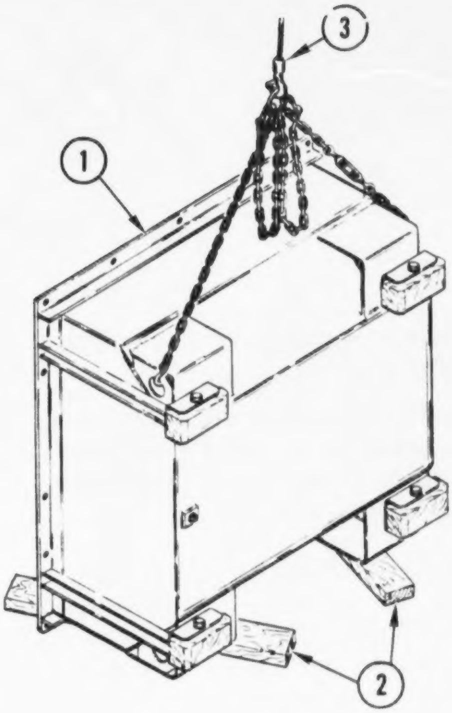
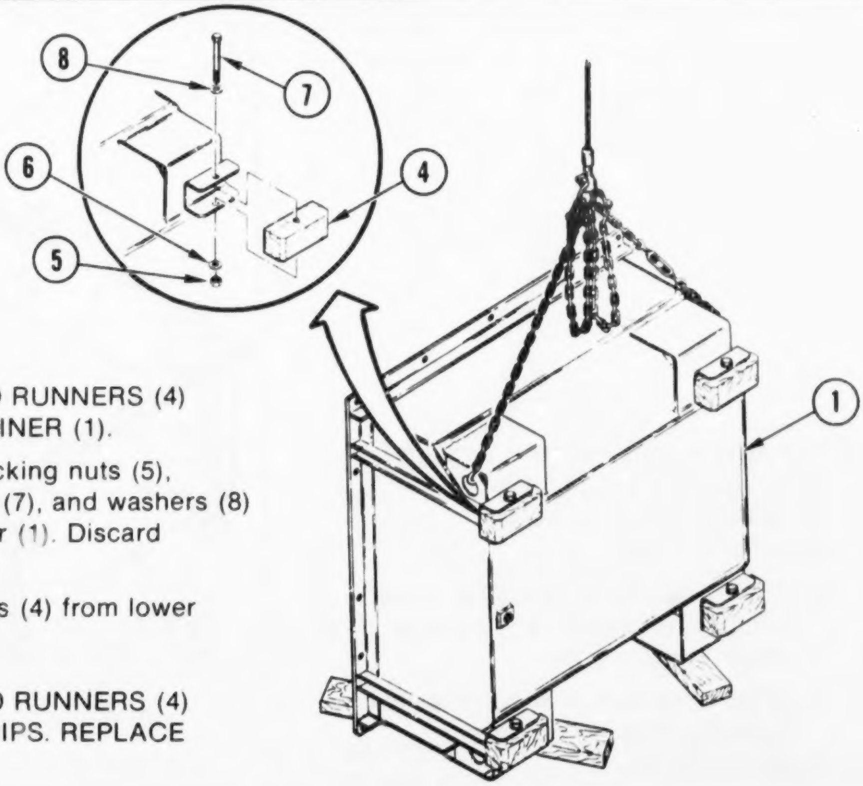


WARNING
Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

13. REPAIRER AND HELPERS LIFT LOWER CONTAINER (1) ONTO ONE SIDE AND POSITION ON PROTECTIVE BLOCKS (2) (ITEM 4).

    a. (H) Using lifting device (3), lift lower container (1) and position on wood blocks (2) (Item 4).

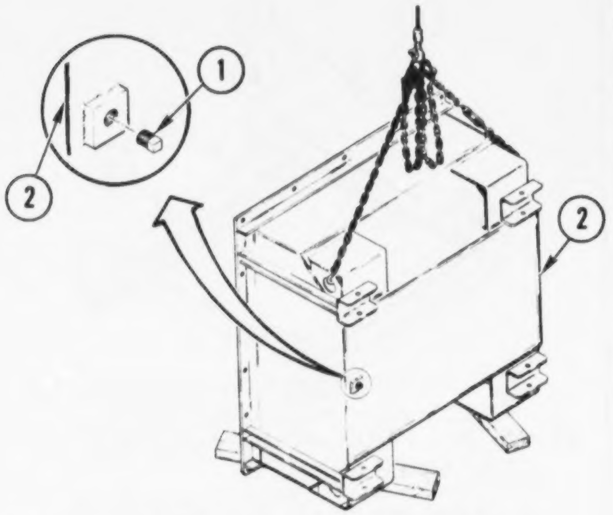


14. REMOVE FOUR WOOD RUNNERS (4) FROM LOWER CONTAINER (1).

    a. Remove four self-locking nuts (5), washers (6), screws (7), and washers (8) from lower container (1). Discard self-locking nuts.

    b. Remove four runners (4) from lower container (1).

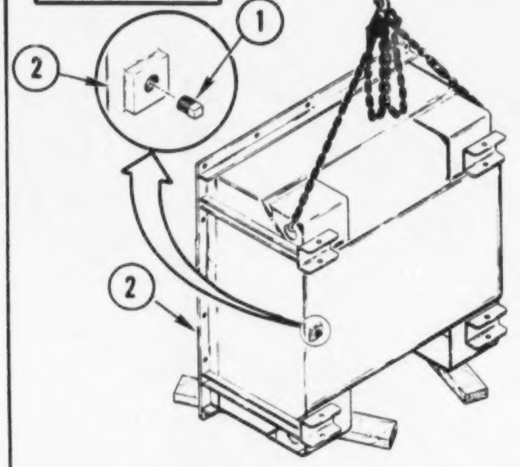
15. INSPECT FOUR WOOD RUNNERS (4) FOR CRACKS AND CHIPS. REPLACE AS NEEDED.



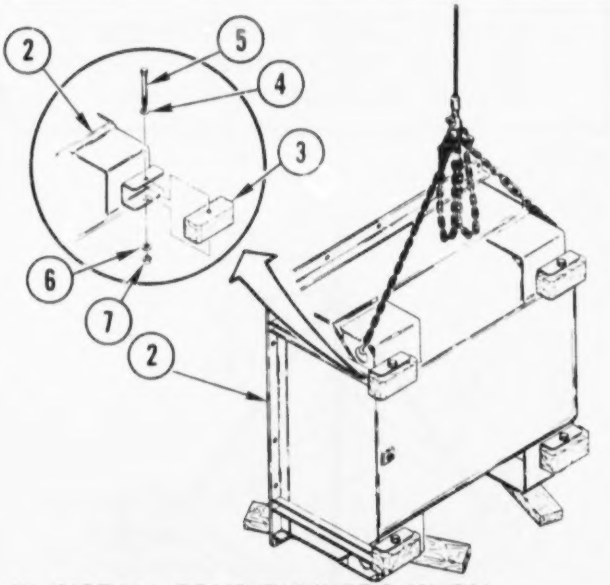
16. REMOVE PLUG (1) FROM LOWER CONTAINER (2).

17. INSPECT PLUG (1) FOR DAMAGE. See page 2-5.
    a. Replace plug (1) if damaged.

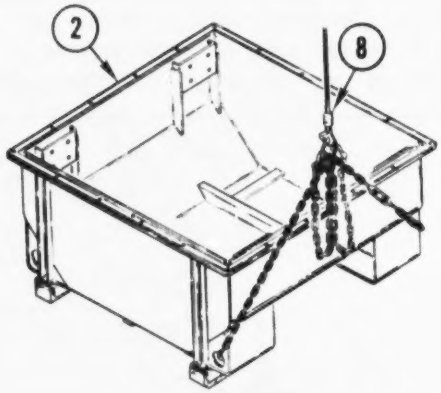
ASSEMBLE



18. INSTALL PLUG (1) IN LOWER CONTAINER (2).
    a. Thread plug (1) into lower container (2).
    b. Tighten plug (1).



19. INSTALL FOUR RUNNERS (3) ON LOWER CONTAINER (2).
    a. Install runner (3), washer (4), screw (5), washer (6), and new self-locking nut (7) on lower container (2).
    b. Repeat step 19a for remaining three runners (3).



WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

20. REPAIRER AND HELPER LIFT LOWER CONTAINER (2) AND PLACE BOTTOM SIDE DOWN.
    a. (H) Using lifting device (8), lift lower container (2) and place on floor, bottom side down.

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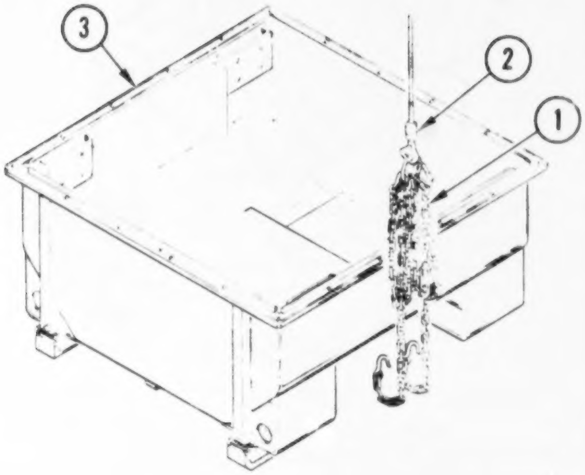
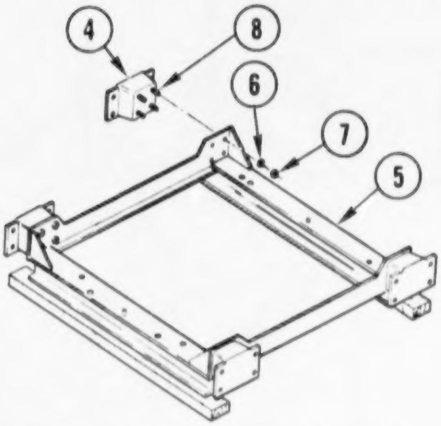


21. REMOVE SLING (1) FROM LIFTING DEVICE (2) AND CORNERS OF LOWER CONTAINER (3).

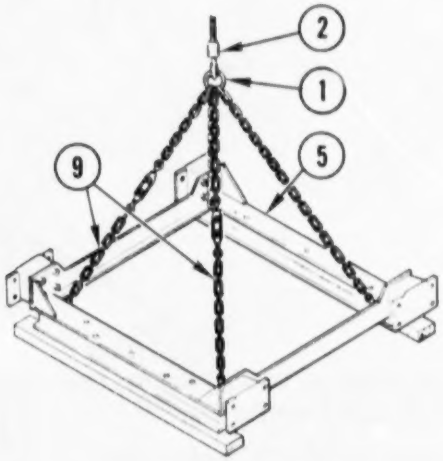
22. WELD LOWER CONTAINER (3), AS NECESSARY. METAL DESIGNATOR IS MIL-S-1261, CLASS I. See TM 9-237.

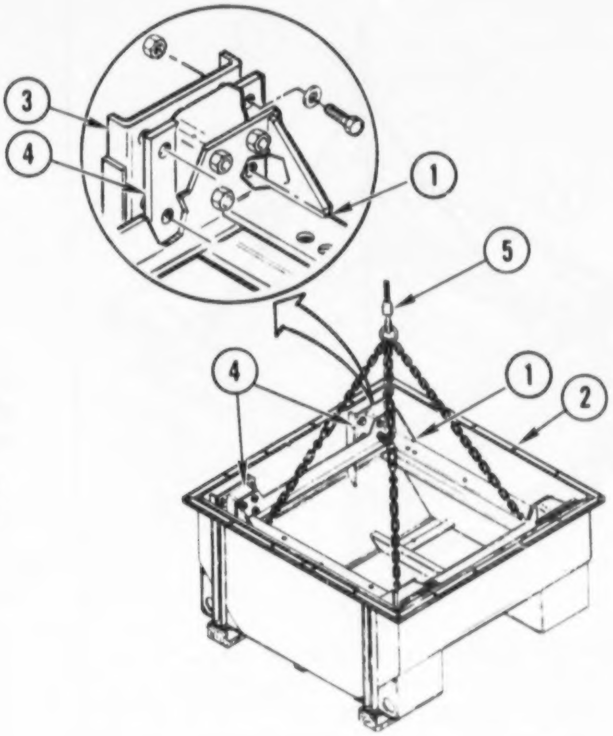


23. INSTALL FOUR MOUNTS (4) ON CONTAINER FRAME (5).
    a. Install mount (4), four washers (6), and new self-locking nuts (7) on container frame (5).
    b. Tighten self-locking nuts (7) until flush with end of mount bolt (8).
    c. Repeats step 23a and 23b for remaining three mounts (4).

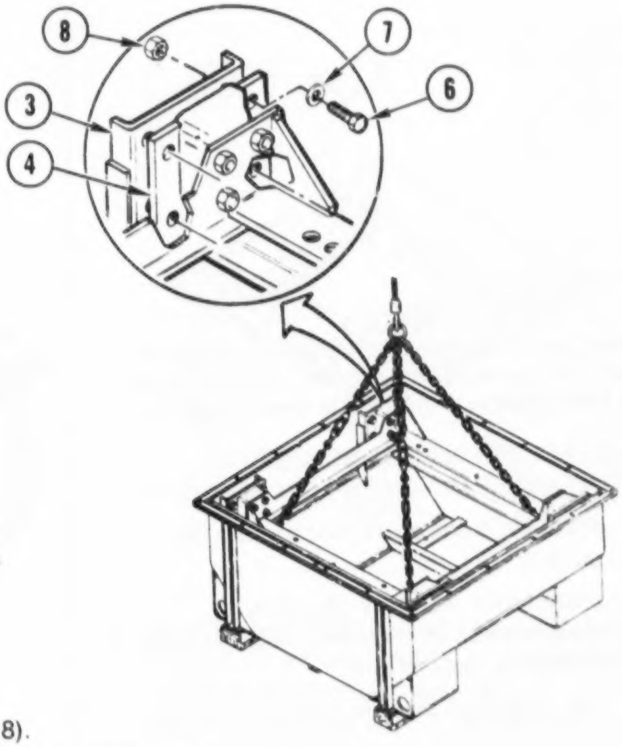
24. USING 1/2-INCH DRIVE TORQUE WRENCH, TORQUE 16 SELF-LOCKING NUTS (7) TO 60-66 ft-lb(8-9 mkg).

25. REPAIRER AND HELPER ATTACH LIFTING SLING (1) TO CONTAINER FRAME (5).
    a. (H) Lower lifting device (2) with sling (1) to reach container frame (5).
    b. Attach each leg of sling (1) to a corner of the container frame (5).
    c. Adjust length of turnbuckle legs (9), if necessary.





26. REPAIRER AND HELPERS INSTALL CONTAINER FRAME (1) IN LOWER CONTAINER (2).
    a. Apply light coat of transmission oil to surface of mount plates (3) and mounts (4).
    b. (H) Using lifting device (5), lift frame (1) and lower into lower container (2).
    c. (H) Aline mounts (4) with mount plates (3) on lower container (2).



27. INSTALL 16 SCREWS (6), WASHERS (7), AND NEW SELF-LOCKING NUTS (8).
    a. Install four screws (6), washers (7), and new self-locking nuts (8) in mounts (4) and mount plates (3).
    b. Repeat step 27a for remaining three mounts (4).
    c. Hand tighten 16 self-locking nuts (8).

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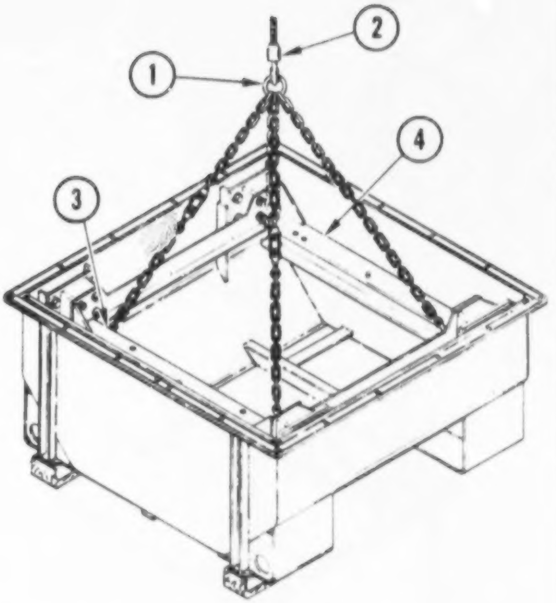
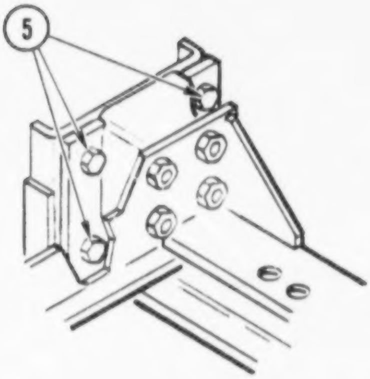


28. REMOVE SLING (1) FROM LIFTING DEVICE (2) AND FOUR CORNERS (3) OF CONTAINER FRAME (4).

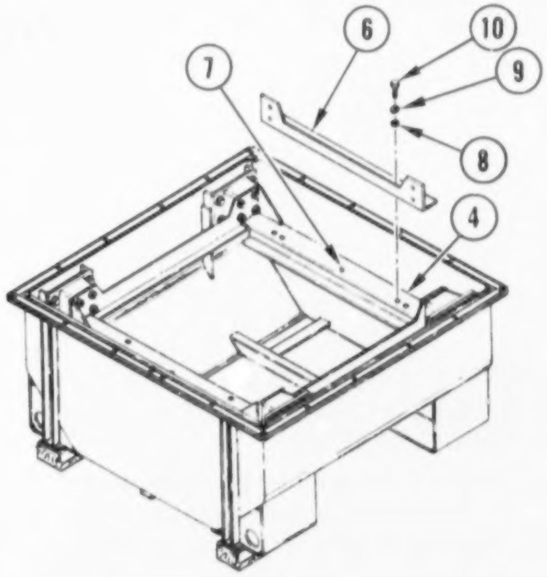


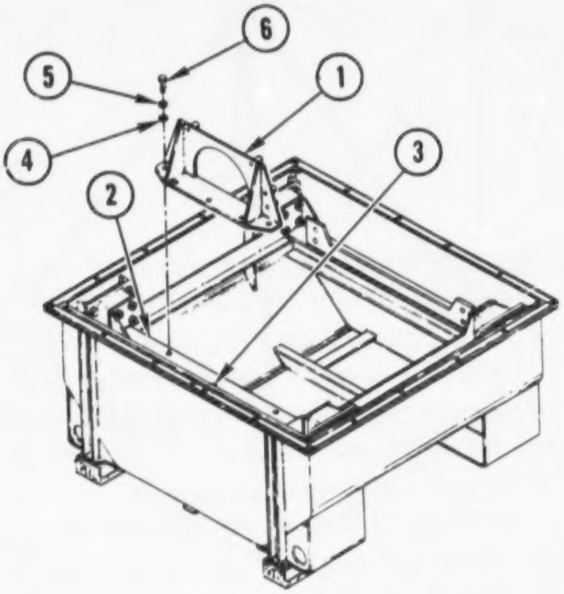
29. USING 1/2-INCH DRIVE TORQUE WRENCH, 3/4-INCH TORQUE WRENCH ADAPTER, AND 10-INCH EXTENSION (FOR BOTTOM NUTS), TORQUE 16 SELF-LOCKING NUTS (5) TO 60-66 ft-lbs (8-9 mkg).

NOTE

Screws securing front transmission container mount to container frame are torqued only after transmission is installed in lower container.

30. INSTALL FRONT TRANSMISSION CONTAINER MOUNT (6) ON FRAME (4).
    a. Position front container mount (6) on pin (7).
    b. Install four washers (8), lock washers (9), and screws (10) on front container mount (6).
    c. Hand tighten screws (10).

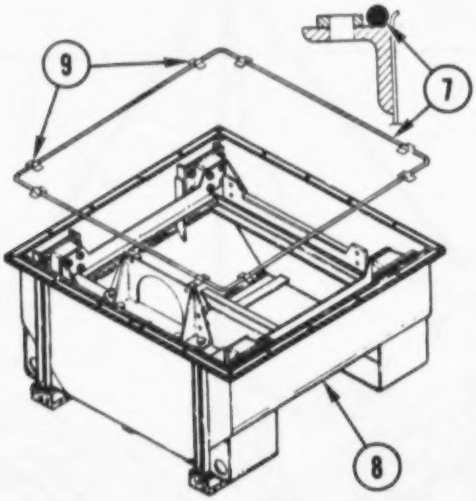




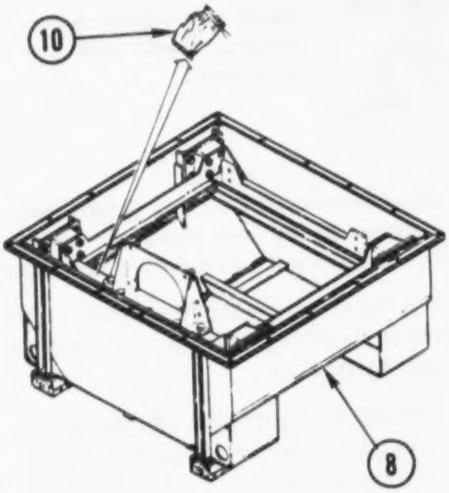
NOTE

Screws securing rear transmission container mount to container frame are torqued only after transmission is installed in lower container.

31. INSTALL REAR TRANSMISSION CONTAINER MOUNT (1) ON FRAME (2).
    a. Position rear container mount (1) on pin (3).
    b. Install four washers (4), lock washers (5), and screws (6) in rear container mount (1).
    c. Hand tighten screws (6).



32. INSTALL GASKET (7) ON LOWER CONTAINER (8).
    a. Position gasket (7) on lower container (8).
    b. Install new tape (9) on gasket (7) in two places at each corner of lower container (8).



33. PLACE SHIPPING BAG (10) CONTAINING 16 FLAT WASHERS, 10 SCREWS, 4 LOCK WASHERS, AND 6 SELF-LOCKING NUTS IN LOWER CONTAINER (8).

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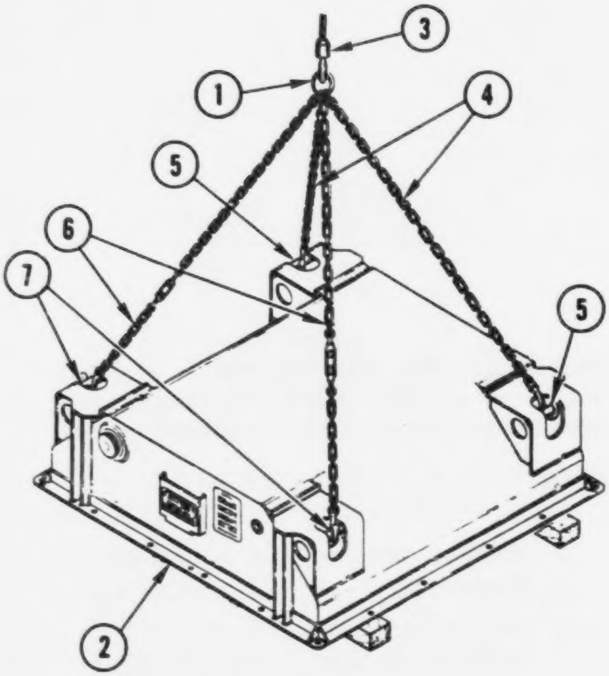
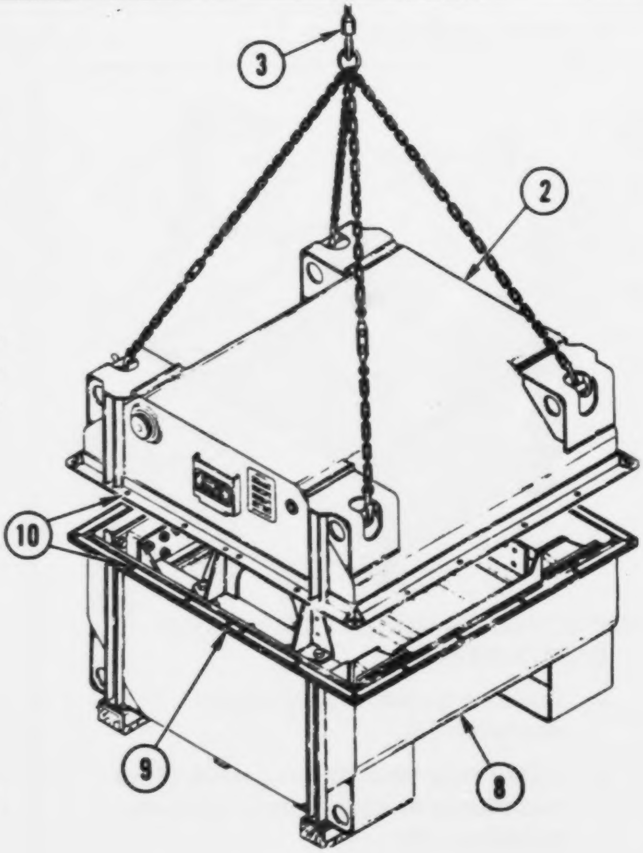


34. REPAIRER AND HELPER ATTACH SLING (1) TO UPPER CONTAINER (2).
    a. Using lifting device (3), lower sling (1) to reach upper container (2).
    b. Attach two legs (4) of sling (1) to rear lifting points (5).
    c. Attach two turnbuckle legs (6) of sling (1) to front lifting points (7).
    d. (H) Adjust length of two turnbuckle legs (6), if necessary.



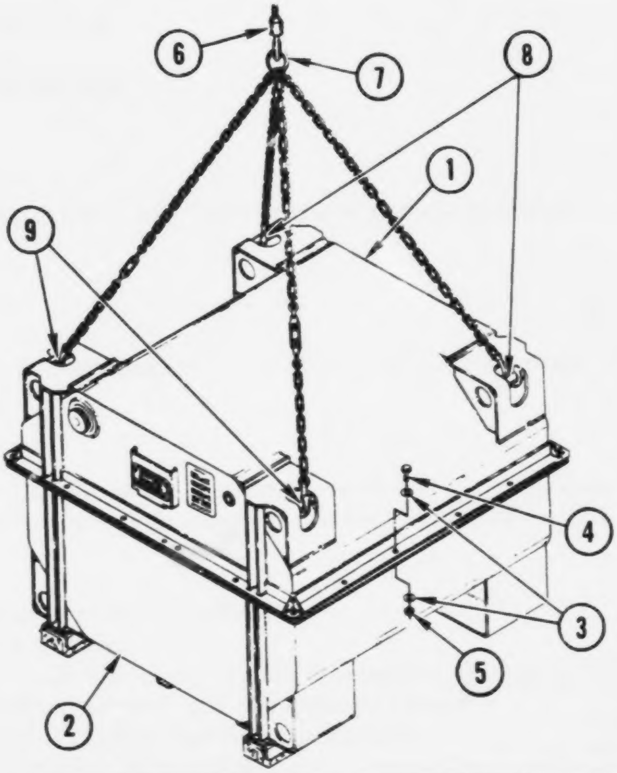
WARNING

Hanging loads could kill or injure you. Keep away from hanging loads and overhead equipment.

NOTE

The lower container has one pin to help aline screw holes in the two container halves. The upper container will go on only in one direction.

35. REPAIRER AND HELPER POSITION UPPER CONTAINER (2) ON LOWER CONTAINER (8).
    a. Using lifting device (3), position upper container (2) over lower container (8).
    b. (H) Aline pin (9) in lower container (8) with hole in upper container (2).
    c. Using lifting device (3), place upper container (2) onto lower container (8) and aline 20 holes (10).



NOTE

Screws securing upper container to lower container are torqued only after transmission is installed in container.

36. SECURE UPPER CONTAINER (1) TO LOWER CONTAINER (2).
    a. Install 20 washers (3), screws (4), washers (3), and self-locking nuts (5).
37. REPAIRER AND HELPER REMOVE LIFTING DEVICE (6) AND SLING (7).
    a. Remove legs of sling (7) from lifting points (8) and (9).
    b. Remove sling (7) from lifting device (6).

END OF SUBTASK

END OF TASK

APPENDIX A

REFERENCES

Purpose

This appendix lists publications which apply to maintaining the Hydromechanical Crossdrive Transmission, HMPT 500.

Arrangement

The publications are arranged by type and then in alphanumeric order by publication number.

Publication Indexes

The following indexes should be consulted often for the latest changes or revisions to references given in this appendix and for new publications relating to material covered in this technical manual.

DA Pam 310-1	Index of Administrative Publications
DA Pam 310-2	Index of Blank Forms
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals, Supply Bulletins, and Lubrication Orders
DA Pam 310-6	Index of Supply Catalogs and Supply Manuals
DA Pam 310-7	Index of Modification Work Orders

Maintenance Forms and Records

DA Form 17	Requisition Form
DA Form 518	Accident Identification Card
DA Form 2028	Recommended Changes to DA Publications
DA Form 2028-2	Recommended Changes to Equipment Technical Manuals
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
DD Form 6	Packing Improvement Report
SF 368	Quality Deficiency Report

Regulations

AR-385-40	Accident Reporting and Records

Lubrication

LO 9-1450-646-12	Lubrication Order for Carrier, Multiple Launch Rocket System (MLRS), XM993 (2350-01-091-5405)
LO 9-2350-252-12	Lubrication Order for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2659)

Field Manuals

FM 9-24	Fundamentals of Machine Tools
FM 21-11	First Aid for Soldiers

Technical Manuals

CTA 50-970	Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)
TM 9-214	Inspection, Care, and Maintenance of Antifriction Bearings
TM 9-237	Theory and Application of Welding
TM 9-247	Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Material
TM 9-1450-646-10	Operator's Manual for Carrier, Multiple Launch Rocket System (MLRS), M993 (2350-01-091-5405)
TM 9-1450-646-20	Unit Maintenance Manual for Carrier, Multiple Launch Rocket System (MLRS), M993 (2350-01-091-5405)
TM 9-1450-646-20P	Unit Maintenance Repair Parts and Special Tools List for Carrier, Multiple Launch Rocket System (MLRS), M993 (2350-01-091-5405)
TM 9-1450-646-34	Intermediate Direct and General Support Maintenance Manual for Carrier, Multiple Launch Rocket System (MLRS), M993 (2350-01-091-5405)
TM 9-1450-646-34P	Intermediate Direct Support and General Support Maintenance Repair Parts and Special Tools List for Carrier, Multiple Launch Rocket System (MLRS), M993 (2350-01-091-5405)
TM 9-2350-252-10	Operator's Manual for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2695) Hull
TM 9-2350-252-10-1	Operator's Manual for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2695) Hull
TM 9-2350-252-20-1	Unit Maintenance Manual for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2695) Hull
TM 9-2350-252-20P-1	Unit Maintenance Repair Parts and Special Tools List for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-10-049-2695), Hull
TM 9-2520-270-34P	Intermediate Direct Support and General Support Maintenance Repair Parts and Special Tools List and Transmission Container Assembly (2520-01-105-6446)
TM 9-2350-252-34-1	Intermediate Direct and General Support Maintenance Manual for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2695) Hull
TM 9-2350-252-34P-1	Intermediate Direct and General Support Maintenance Repair Parts and Special Tools List for Fighting Vehicle, Infantry, M2 (2350-01-048-5920) and Fighting Vehicle, Cavalry, M3 (2350-01-049-2695), Hull
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
TM 740-90-1	Administrative Storage of Equipment

APPENDIX B

INTERMEDIATE DIRECT AND GENERAL SUPPORT MAINTENANCE EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

SCOPE

This appendix lists expendable supplies and materials you will need to maintain the Hydromechanical Crossdrive Transmission, HMPT 500, and container. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

EXPLANATION OF COLUMNS

a. *Column 1, Item Number.* This number is assigned to the entry in the listing. It is referenced in the Materials/Parts section of the task to identify the material (e.g., "Cleaning solvent (Item 1, App. B)").

b. *Column 2, Level.* This column identifies the lowest level of maintenance below that requires the listed item.

F — Intermediate Direct Support Maintenance
H — Intermediate General Support Maintenance

c. *Column 3, National Stock Number.* This is the National Stock Number (NSN) assigned to the item; use it to request or requisition the item.

d. *Column 4, Description.* This column indicates the Federal item name and the part number in parentheses followed by the Federal Supply Code for Manufacturer (FSCM).

e. *Column 5, Unit of Measure (U/M).* This column indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue, order the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION Part Number & FSCM			(5) U/M
1	F	6810-00-270-9982	Cleaning Solvent	(PD680)	81348	QT
2	H	5350-00-221-0872	Crocus Cloth	------	81348	SH
3	F	6850-00-263-8640	Desiccant, Protek-Sorb (Four units per bag)	(121)	------	EA
4	H		Dry Ice, Type-S	------	81349	LB
4A	H	4720-01-166-3356	Flushing Hose	------	------	EA
4B	H	5345-00-260-0759	Honing Stone	A79CFO	70752	EA
5	F	9505-00-847-1663	Lockwire	(MS20995C32)	81349	FT
6	F	7510-00-290-2027	Masking Tape	(PPTT42)	------	FT
7	F	9150-00-250-0926	Petrolatum	14P1	82746	LB
8	H	------	Pipe Sealant	------	05972	OZ
9	F	8105-00-837-7754	Plastic Bag	(PPPB26TY2ST3)	------	EA
10	H	7930-00-253-0779	Scrubbing Soap	(AA44)	58536	GL
11	F	8030-00-148-9833	Sealant Compound	(LOCTITE 271-21)	05972	OZ
12	F	9150-00-186-6681	Transmission Oil, GR30 XMSN HDO LUBO	(MIL-L-2104, Allied C030)	81349	QT
13	F	7920-00-205-1711	Wiping Rag	(AA531)	58536	LB

APPENDIX C

INTERMEDIATE DIRECT AND GENERAL SUPPORT MAINTENANCE TOOL APPENDIX

Section I. INTRODUCTION

SCOPE

This appendix lists special tools you will need to maintain and repair the Hydromechanical Crossdrive Transmission, HMPT 500, and container.

EXPLANATION OF COLUMNS

a. *Column 1, Item Number.* This number is assigned to the entry in the listing. It is referenced in the Tools section of the task to identify the tool (e.g., "Retaining ring pliers (Item 59, App. C)").

b. *Column 2, Item Name.* This column indicates the Federal item name of the tool.

c. *Column 3, National Stock Number.* This is the National Stock Number (NSN) assigned to the item; use it to request or requisition the item.

d. *Column 4, Part Number.* This is the Part Number assigned to the item; use it to request or requisition the item.

e. *Column 5, Reference.* This column indicates a reference where the item is further described.

Section II. TOOL APPENDIX

(1) ITEM NUMBER	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) REFERENCE
1	Adjustable Wrench: 15 in	5120-00-423-6728		SC 4910-95-CL-A31
2	Angle Bracket	5340-01-120-3026	11629684	TM 9-2520-270-34P
3	Arbor Press	3444-00-449-7295		SC 4910-95-CL-A31
4	Backlash Actuator Assembly	4910-01-118-5959	11629686	TM 9-2520-270-34P
5	Bearing Extractor	5120-01-153-1812	11629778	TM 9-2520-270-34P
6	Bearing Installer	5120-01-115-1814	11629631	TM 9-2520-270-34P
7	Bearing Installer	5120-01-115-1815	11629634	TM 9-2520-270-34P
8	Bearing Installer	5120-01-115-1816	11629672	TM 9-2520-270-34P
9	Bearing Installer	5120-01-115-1820	11629694	TM 9-2520-270-34P
10	Bearing Installer	5120-01-115-2284	11628427	TM 9-2520-270-34P
11	Bearing Installer	5120-01-141-9271	11629801	TM 9-2520-270-34P
12	Bearing Installer	5120-01-141-9272	11629803	TM 9-2520-270-34P
13	Bearing Installer	5120-01-141-9273	11629807	TM 9-2520-270-34P
14	Bearing Installer	5120-01-142-8236	11629808	TM 9-2520-270-34P
15	Bearing Nut Wrench	5120-01-115-1819	11629690	TM 9-2520-270-34P
16	Bevel Gear Shimming Fixture	2520-01-114-7394	11628378	TM 9-2520-270-34P
17	Box Wrench: 1 1/4 in and 1 3/8 in	5120-00-184-8677		SC 4910-95-CL-A31
18	C-Clamp: 6 in by 2 3/4 in	5120-00-180-0909		SC 4940-95-CL-B04
19	Clean out Housing Repair Kit	2520-01-144-8673	5705237	TM 9-2520-270-34P
20	Crowfoot Attachment: 3/8-in dr, 9/16 in	5120-01-092-3276	FRH-180S	TM 9-2520-270-34P
21	Crowfoot Attachment: 3/8-in dr, 5/8 in	5120-00-184-8398	FC20	TM 9-2520-270-34P
22	Crowfoot Attachment: 3/8-in dr, 11/16 in	5120-00-236-2261	FC22	TM 9-2520-270-34P
23	Dial Indicator	5210-01-145-5803	CM260	TM 9-2520-270-34P
24	Drag Wrench	5120-01-115-1817	11629681	TM 9-2520-270-34P
25	Drive Pin Punch	5120-01-128-2750	11628611	TM 9-2520-270-34P
26	Drive Pin Punch Set	5120-00-883-3003		SC 4910-95-CL-A31
27	Eyebolt	5306-00-050-0347	MS51937-5	TM 9-2520-270-34P
28	Fixture Removal Assembly	4910-01-118-5957	11629626-1	TM 9-2520-270-34P
29	Fixture Removal Assembly	4910-01-118-5958	11629626-2	TM 9-2520-270-34P
30	Flat Washer	5310-00-080-6004	MS27183-14	TM 9-2350-252-20P-1
31	Fluid Gun	4930-00-222-2680		SC 4910-95-CL-A31
32	Funnel: 1 qt, 8-in Spout	7240-00-559-7364		SC 4910-95-CL-A31
33	General Mechanic's Tool Kit: Automotive	5180-00-177-7033		SC 5180-95-CL-N26
--	(Deleted)			
35	Hex-Drive Key Set	5120-00-935-4641		SC 4910-95-CL-A31
36	Hex-Head Cap Screw	5305-00-269-2811	MS90726-67	TM 9-2350-252-20P-1
37	Hex-Head Cap Screw: 3/8-24 x 2 3/4 in	5305-01-109-4532	11629094-67	TM 9-2520-270-34P
38	Impact Socket Set: 3/4-in dr	5120-00-117-0466		SC 4910-95-CL-A31
39	Industrial Goggles	4240-00-269-7912		SC 4910-95-CL-A31
39A	Inserted Hammer Face Holder	5120-00-903-8553		SC 4910-95-CL-A31
39B	Inserted Hammer Face	5120-00-540-4273		SC 4910-95-CL-A31
39C	Inserted Hammer Face	5120-00-582-8202		SC 4910-95-CL-A31
40	Inserts Wrench		R1111W	TM 9-2520-270-34P
41	Inside/Outside Indicator Caliper	5210-01-063-3353	CM-210	TM 9-2520-270-34P
42	Leather Gloves	8415-00-268-7859		SC 4910-95-CL-A31
43	Lever Arm	3040-01-107-3388	12294965	TM 9-2350-252-20P-1
44	Lifting Sling	4910-01-166-2052	12323405	TM 9-2520-270-34P
45	Lockring Drive Tool		R1711D	TM 9-2520-270-34P
--	(Deleted)			
47	Machinist's Vise: 4-in jaw	5120-00-293-1439		SC 4910-95-CL-A31
48	Mechanical Puller	5120-00-620-0020		SC 4910-95-CL-A31
49	Mechanical Puller Kit	5120-00-423-1596		SC 4910-95-CL-A31
50	Mechanical Puller Kit	5120-00-357-6917		SC 4910-95-CL-A31
51	Mechanical Puller Kit	5120-00-313-9496		SC 4910-95-CL-A31
52	Micrometer Caliper Set	5210-00-225-9763		SC 4910-95-CL-A63
53	Micrometer Caliper Set	5210-00-554-7134	GGG-C-105	TM 9-2350-252-34P-1
54	Micrometer Depth Gage	5210-00-619-4045	445B6RL	TM 9-2520-270-34P
55	Oil Seal Replacer	5120-01-115-1895	11629671	TM 9-2520-270-34P
56	Output Holding Fixture	4910-01-132-0873	11629414	TM 9-2520-270-34P

TOOL APPENDIX (Cont)

(1) ITEM NUMBER	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) REFERENCE
57	Output Housing Installer	4910-01-122-2242	11628416	TM 9-2520-270-34P
58	Portable Electric Drill: 1/2 in	5130-00-889-9004		SC 4910-95-CL-A31
59	Retaining-Ring Pliers	5120-00-595-9551		SC 4910-95-CL-A31
60	Retaining-Ring Pliers: External	5120-00-288-9717		SC 4910-95-CL-A31
61	Retaining-Ring Pliers: Internal	5120-00-293-0186		SC 4910-95-CL-A31
62	Screw Extractor Set	5120-00-610-1888		SC 4910-95-CL-A31
63	Screw-Thread Insert Kit	5180-00-935-0738		SC 4910-95-CL-A31
64	Screw-Thread Insert Kit	5180-00-935-0736		SC 4910-95-CL-A31
65	Screw Threading Set	5180-00-448-2362		SC 4910-95-CL-A31
66	Self-Locking Bolt: 5/16 - 18 x 3 1/4 in	5306-00-957-2292	MS51095-342	
67	Self-Locking Nut	5310-00-959-1488	MS51922-21	TM 9-2350-252-20P
68	Shaft-Seal Driver	4910-01-128-2673	11627873	TM 9-2520-270-34P
69	Slide-Hammer Adapter	5120-01-115-1818	11629687	TM 9-2520-270-34P
70	Slip-Joint Pliers: 5 in	5120-00-278-0350		SC 5180-90-CL-N05
71	Slip-Joint Pliers: 10 in	5120-00-278-0352		SC 5180-90-CL-N05
72	Small-Hole Gage Set	5210-00-449-7014	S8295	TM 9-2520-270-34P
73	Snap-Ring Guide Fixture	4910-01-120-3669	11629661	TM 9-2520-270-34P
74	Socket Wrench Adapter: 3/8-in dr to 1/2-in dr	5120-00-240-8703	EX503B	TM 9-2520-270-34P
75	Socket Wrench Adapter: 1/2-in dr to 3/8-in dr	5120-00-240-8702	A4	TM 9-2520-270-34P
76	Socket Wrench Adapter: 1/2-in dr to 3/4-in dr	5120-00-144-5207		SC 4910-95-CL-A62
77	Socket Wrench Adapter: 3/4-in dr to 1-in dr	5120-00-277-8104	LA72	TM 9-2520-270-34P
78	Socket Wrench Attachment: 1/4-in dr, 3/32-in hex	5120-00-596-0930	TMA3	TM 9-2520-270-34P
79	Socket Wrench Attachment: 3/8-in dr, 1/8-in hex	5120-01-016-9202	FA4A	TM 9-2520-270-34P
80	Socket Wrench Attachment: 3/8-in dr, 5/32-in hex	5120-00-969-0071	FA5A	TM 9-2520-270-34P
81	Socket Wrench Attachment: 3/8-in dr, 3/16-in hex	5120-01-043-2283	FA-6L	TM 9-2520-270-34P
82	Socket Wrench Attachment: 3/8-in dr, 1/4-in hex	5120-00-596-8508	FA8A	TM 9-2520-270-34P
83	Socket Wrench Attachment: 3/8-in dr, 3/8-in hex	5120-00-596-1199	FA12A	TM 9-2520-270-34P
84	Socket Wrench Attachment: 1/2-in dr, 5/8-in hex	5120-00-390-7797	AS620	TM 9-2520-270-34P
85	Socket Wrench Attachment: 3/8-in dr, 5/16-in hex	5120-00-683-8602	FA10B	TM 9-2520-270-34P
86	Socket Wrench Attachment: 1/2-in dr, 9/16-in hex	5120-00-390-7796	AS618	TM 9-2520-270-34P
87	Socket Wrench Set: 1-in dr	5120-00-081-2309		SC 4910-95-CL-A31
88	Socket Wrench Set: 1/4-in dr	5120-00-081-2305		SC 4910-95-CL-A31
89	Socket Wrench Set: 3/8-in dr	5120-00-322-6231		SC 4910-95-CL-A31
90	Spanner Wrench: 2 in to 4 3/4 in	5120-00-277-9076		SC 4910-95-CL-A31
91	Spring Scale	6635-00-918-2788	DPP80	TM 9-2520-270-34P
92	Tapered Pin Assortment	5315-00-271-4128		SC 4940-95-CL-B04
93	Telescoping Gage Set	5210-00-473-9350	79L	TM 9-2520-270-34P
94	Thermal Drying Oven	4430-01-015-4432	246	Government furnished equipment
95	Thread Die and Tap Set	5136-00-006-1556	TD2500	TM 9-2520-270-34P
96	Tip-Over Stand	4910-01-159-6197	82-7012	TM 9-2520-270-34P
97	Torque Wrench Adapter: 1/2-in dr to 3/4 in box	5120-00-399-1154	2588757	TM 9-2520-270-34P
98	Torque Wrench: 1/4-in dr, 10-200 in-lbs	5120-01-133-2347	6061	TM 9-2520-270-34P
99	Torque Wrench: 3/8-in dr, 0-150 in-lbs	5120-00-230-6380		SC 4910-95-CL-A31
100	Torque Wrench: 1/2-in dr, 0-175 ft-lbs	5120-00-640-6364		SC 4910-95-CL-A31
101	Torque Wrench: 3/4-in dr, 0-600 ft-lbs	5120-00-221-7983		SC 4910-95-CL-A31
102	Torque Wrench: 1/2-in dr, 0-300 in-lbs	5120-00-247-2536		SC 4910-95-CL-A31
103	Transmission Insert Repair Kit		5705241	TM 9-2520-270-34P
104	Transmission Mounting Plate Kit	4910-01-165-0489	5705238	TM 9-2520-270-34P
105	Twist-Drill Set	5133-00-596-8088		SC 4910-95-CL-A31
106	Twist-Drill Set	5133-00-293-0983		SC 4910-95-CL-A31
107	Wire-Twister Pliers	5120-00-305-2306	41P2098-5	TM 9-2520-270-34P

APPENDIX D

ILLUSTRATED LIST OF MANUFACTURED ITEMS

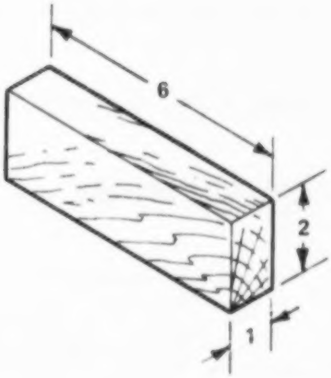
Section I. INTRODUCTION

This appendix tells you how to make items authorized to be manufactured or fabricated at Intermediate Direct and General Support maintenance.

All bulk materials needed for manufacture of an item are listed. A part number or specification number may be given.

Section II. INDEX OF MANUFACTURED ITEMS

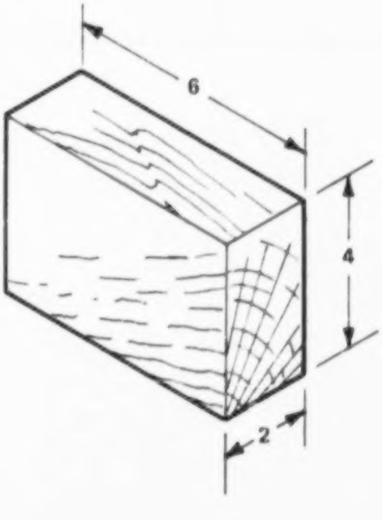
ITEM NUMBER	NAME	PAGE NUMBER
1	Wood Block 1 x 2 x 6 inches	D-2
2	Wood Block 2 x 4 x 6 inches	D-2
3	Wood Block 2 x 4 x 12 inches	D-3
4	Wood Block 2 x 4 x 18 inches	D-3
5	Wood Block 2 x 4 x 60 inches	D-4
6	Wood Block 2 x 6 x 6 inches	D-4
7	Measuring Plate 1/4 x 2 x 12 inches	D-5



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

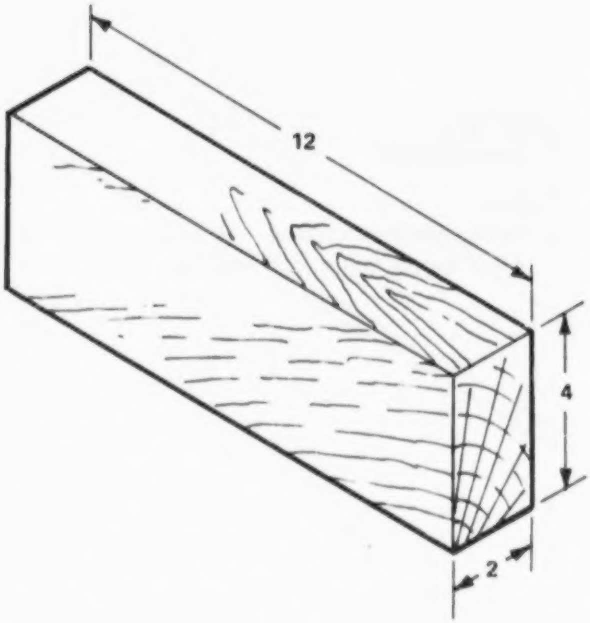
Item 1 - Wood Block (1 x 2 x 6 inches)



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

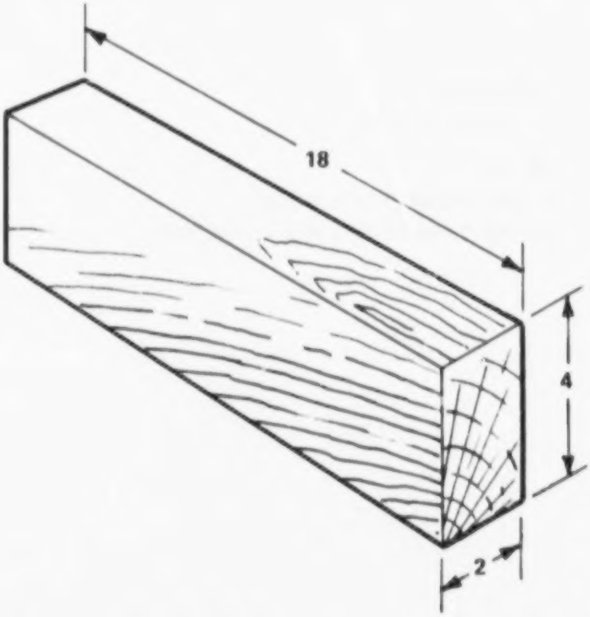
Item 2 - Wood Block (2 x 4 x 6 inches)



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

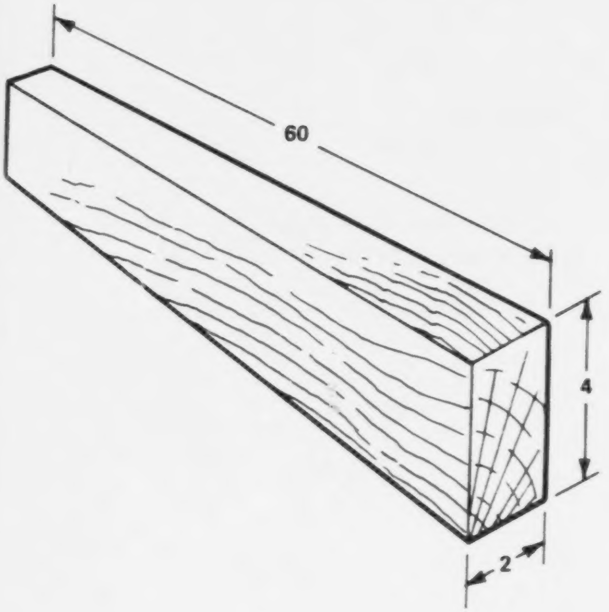
Item 3 - Wood Block (2 x 4 x 12 inches)



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

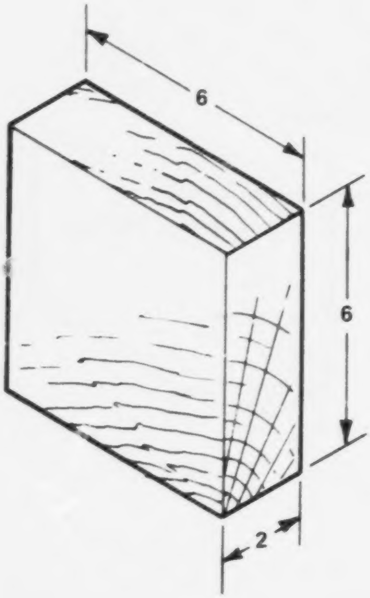
Item 4 - Wood Block (2 x 4 x 18 inches)



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

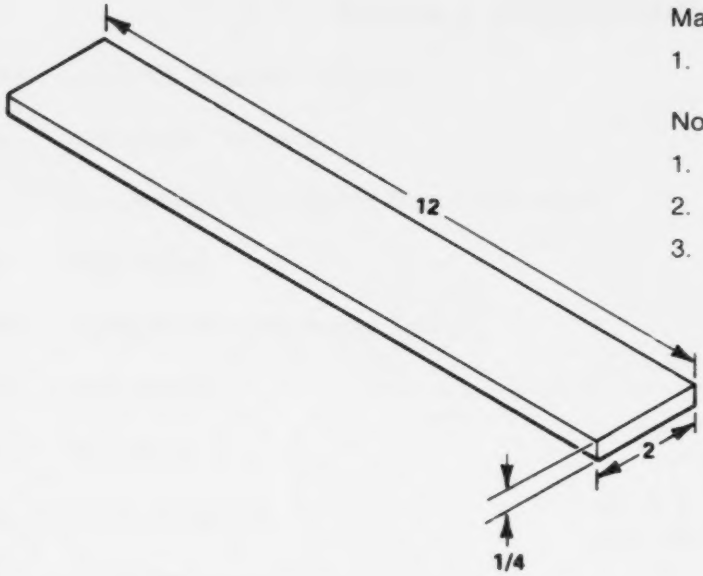
Item 5 - Wood Block (2 x 4 x 60 inches)



Materials:
1. Wood block

Notes:
1. Fabricate from wood.
2. All dimensions are in inches.

Item 6 - Wood Block (2 x 6 x 6 inches)



Materials:

1. Steel or aluminum.

Notes:

1. Fabricate from flat metal stock.
2. Thickness may exceed 1/4 inch.
3. All dimensions are in inches.

Item 7 - Measuring Plate (1/4 x 2 x 12 inches)

GLOSSARY

Section I. ABBREVIATIONS

AOAP	Army Oil Analysis Program
cmkg	centimeter kilogram
EIR	Equipment Improvement Recommendation
ft-lb	foot-pound
HMPT	Hydromechanical Power Train
in-lb	inch-pound
kPa	kilopascal
mkg	meter kilogram
mm	millimeter
psi	pounds per square inch
S.D.	Setting Distance

Section II. UNUSUAL TERMS

actuate: to put into mechanical action or motion

beveled: slanted

braze: to burn

burr: a thin ridge or area of roughness produced in cutting or shaping

chase: to groove

crocus: a dark red ferric oxide used for polishing metals

extruded: forced, pressed, or pushed out

ferrous: contains iron

fillets: a concave junction formed where two surfaces meet

galled: worn away by friction

hone: sharpen, enlarge, smooth out

land: an area of a surface partly machined (as with grooves) that is left without such machining

nonferrous: does not contain iron

race: a track or channel in which something rolls or slides, such as a groove for the balls, in a bearing

recess: indentation

scored: grooved, scratched, notched

seat: to rest properly upon

trunnion: transmission side support

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No Entry

Z

No Entry

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

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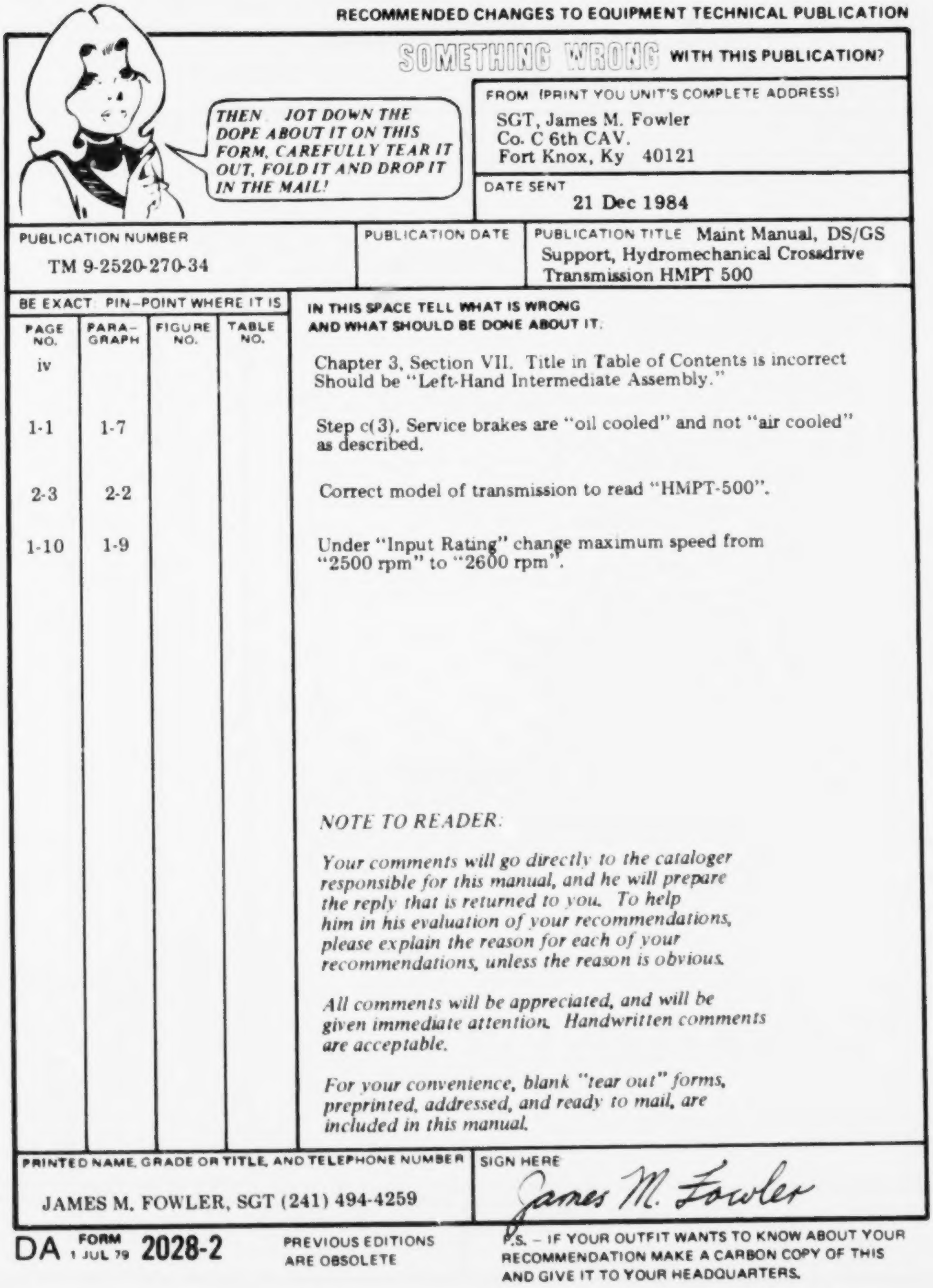
Major General, United States Army
The Adjutant General

Distribution:

Distribute IAW DA Form 12-37 for Direct and General Support Maintenance requirements for Bradley Infantry/Cavalry Fighting Vehicles, M2/M3 and DA Form 12-32, Direct and General Support Maintenance requirements for MLRS.

"You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures please let us know. Mail your letter or DA Form 2028 directly to (insert name of proponent). A reply will be furnished to you."

Example of a Tear-out Error Reporting Form



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DATE SENT 21 Dec 1984

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.
iv				Chapter 3, Section VII. Title in Table of Contents is incorrect Should be "Left-Hand Intermediate Assembly."
1-1	1-7			Step c(3). Service brakes are "oil cooled" and not "air cooled" as described.
2-3	2-2			Correct model of transmission to read "HMPT-500".
1-10	1-9			Under "Input Rating" change maximum speed from "2500 rpm" to "2600 rpm".

NOTE TO READER:

Your comments will go directly to the cataloger responsible for this manual, and he will prepare the reply that is returned to you. To help him in his evaluation of your recommendations, please explain the reason for each of your recommendations, unless the reason is obvious.

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Pounds
1 Metric Ton = 1000 Kilograms = 1 Megagrams = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

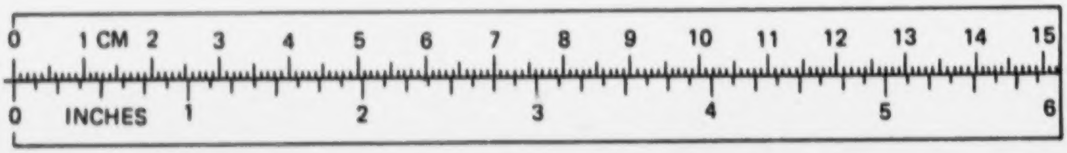
1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

0.556 (°F—32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
1.8 (°C + 17.78) = °F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY	TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540	Centimeters	Inches	0.394
Feet	Meters	0.305	Meters	Feet	3.280
Yards	Meters	0.914	Meters	Yards	1.094
Miles	Kilometers	1.609	Kilometers	Miles	0.621
Square Inches	Square Centimeters	6.451	Square Centimeters	Square Inches	0.155
Square Feet	Square Meters	0.093	Square Meters	Square Feet	10.764
Square Yards	Square Meters	0.836	Square Meters	Square Yards	1.196
Square Miles	Square Kilometers	2.590	Square Kilometers	Square Miles	0.386
Acres	Square Hectometers	0.405	Square Hectometers	Acres	2.471
Cubic Feet	Cubic Meters	0.028	Cubic Meters	Cubic Feet	35.311
Cubic Yards	Cubic Meters	0.765	Cubic Meters	Cubic Yards	1.308
Fluid Ounces	Milliliters	29.573	Milliliters	Fluid Ounces	0.034
Pints	Liters	0.473	Liters	Pints	2.113
Quarts	Liters	0.946	Liters	Quarts	1.057
Gallons	Liters	3.785	Liters	Gallons	0.264
Ounces	Grams	28.349	Grams	Ounces	0.035
Pounds	Kilograms	0.454	Kilograms	Pounds	2.205
Short Tons	Metric Tons	0.907	Metric Tons	Short Tons	1.102
Pound-Feet	Newton-Meters	1.356	Newton Meters	Pound-Feet	0.738
Pounds per Square Inch	Kilopascals	6.895	Kilopascals	Pounds per Square Inch	0.145
Miles per Gallon	Kilometers per Liter	0.425	Kilometers per Liter	Miles per Gallon	2.352
Miles per Hour	Kilometers per Hour	1.609	Kilometers per Hour	Miles per Hour	0.621



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